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Practical Pharmacy Edition

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Editorial

OPENING AND CLOSING HOURS

FOR as long as most pharmacists can remember, the question of early opening and late closing hours has been the subject of great complaint. Reform has been badly needed for many years in this regard and many pharmacists today are looking hopefully to the government for some type of order which will require drug stores to open not earlier than 9 o'clock in the morning and to close not later than 9 or 10 o'clock in the evening as a conservation measure. In some quarters, pharmacists have openly urged the Government to take such a step, and the Office of Price Administration is believed to be studying the matter at the present time.

Admitting at the very first that the long hours discourage many young men from entering this field, that in normal times there is little reason for most pharmacies to open at 7:00 or 8:00 a. m. and to remain open until 11:00 or 12:00 p. m., and that such shorter hours would not inconvenience the public to any appreciable extent, there is, however, real reason to ask ourselves two questions:

1. Is this the time to propose earlier closing hours?

2. Do we want the Government to dictate such hours?

Virtually every community in the country is experiencing a shortage of physicians at the present time and this condition may be expected to become even more acute as the war continues and an increasing number of doctors are called to the service of the armed forces. Two or three physicians are now caring for patients who formerly were served by five or six physicians. The physicians who remain in civilian service are going to be hard pressed to see all the patients who need their attention. They will have to cut down as much as possible on home calls and see as many patients as they can at their offices; thus conserving the time they would spend traveling from one home to another. This will necessarily mean longer office hours and the doctor who used to see patients from 5 to 7 in the evening will be busy in his office until 9 or 9:30, with two or three house calls still to make after office hours. In other words, the daily period during which the public regularly receives medical care will be considerably lengthened. It must be assumed that these patients will require pharmaceutical service and that they will have prescriptions to be filled during the late hours of the evening.

Thus it hardly seems wise to contemplate earlier closing hours for pharmacies during the emergency, unless we are prepared to contend that pharmaceutical services are not necessary as an adjunct to medical services and if we wish to encourage physicians to dispense their own medicines to a greater extent than they do at present. The doctor who sees patients from 9:00 p. m. to 11:00 p. m. isn't going to let them wait until morning to obtain needed medicines. Of course, the physician will always be called upon to make a few calls at 1:00 or 2:00 a. m., after pharmacies have closed, but the point is that during the present emergency he will see many patients every evening between the hours of 9:30 and 11:00 p. m.

Recently a draft board in an eastern state reviewed the case of a pharmacist who asked deferment on the grounds that his pharmacy was the only one in the community and the nearest town was three miles away. Under ordinary circumstances this situation might

have qualified him for deferment as a "necessary man," but the draft board found that he conducted a professional pharmacy which closed at an early hour. The Board decided that if the people of his community had to go three miles to the next town for pharmaceutical service after his pharmacy was closed, it would be no hardship for them to travel this distance during the day. The pharmacist was drafted.

Either pharmaceutical services are necessary to the maintenance of public health or they are not; if they are, they must be available during the hours that a considerable portion of the public has need for them.

The second point is, do we want the Government to dictate the hours which pharmacies can be open? Many pharmacists are openly inviting this action, while others fear it. It is a controversial point involving, as much as anything else, the individual's social beliefs. In addition to having OPA or some other governmental agency dictate opening and closing hours, some persons want the Government to decide how many pharmacies are needed to supply the public with essential pharmaceutical services and, having decided that there should be but 35,000 or 40,000 stores, compel the others to close and prohibit others from opening. Still others advocate that the Government take over the revision and issuance of the United States Pharmacopœia and National Formulary and dictate drug standards. Others believe that some Government agency should limit the number of barbituric acid compounds, digitalis preparations, liver extracts, etc., which may be marketed.

If and when the day comes that the Government exercises such restrictions over the practice of pharmacy, we may well ask ourselves what has happened to our democracy, equal opportunity and free enterprise. Before we ask the Government to regulate us, let's make sure that we want to exchange our freedom to open and close our pharmacies whenever we believe our services are required, to open a new store whenever we feel we have an opportunity to render pharmaceutical services better than they are being rendered, and to live with a minimum of governmental restrictions.

It is a mistake to dismiss the matter of restrictions on hours as an "emergency measure" for the duration of the war. In all probability a great number of the present "emergency measures" are going to be continued long after the war as part of our national economy.

Those who advocate governmental dictation of earlier closing hours for pharmacies advance the project as a conservation measure to save light, heat and the physical energies of pharmacists. If radical conservation measures are necessary to save electricity, gas and fuel, there are other points at which the conservation should start first; many other retail institutions are far less important to the community than a pharmacy which renders necessary health services.

If we are honest with ourselves we must admit that the only problem in connection with drugstore hours is one of our own making. A pharmacist may close his pharmacy at any time he chooses. The difficulty is that he wants every other pharmacist to close his pharmacy at the same hour so that he will not lose an advantage to his competitor. Voluntary agreements between pharmacists as to closing hours have been generally ineffective because a few pharmacists break the agreements. One physician doesn't worry about the office hours of other physicians, nor does he try to prohibit other physicians from making calls in the middle of the night merely because he doesn't want to make them. One dentist doesn't worry if other dentists have evening office hours while he doesn't. Why should one pharmacist worry over how late other pharmacies remain open?

It is entirely possible that if the efforts of those who seek to have the Government step into this field and arbitrarily limit the hours during which a pharmacy may be open are successful, the profession may lose far more than it gains.

Roy Bird Cook talks to the nation as he opens National Pharmacy Week.

WAR ACTIVITIES OF PHARMACISTS

by ROY BIRD COOK

PRESIDENT OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

AN ADDRESS DELIVERED OVER THE COAST - TO - COAST BLUE NETWORK OF RCA ON SATURDAY, OCTOBER 17, AS PART OF THE 18th ANNUAL OBSERVANCE OF NATIONAL PHARMACY WEEK

TONIGHT in the tropics, malaria stalks the battlefield. More deadly than the "zero plane" which looms overhead and drops its lethal bombs; more savage than the camouflaged Jap who sits among the foliage of the tropical trees with a high-powered rifle and snipes at passing soldiers; more to be feared than any invasion task force yet assembled by the enemy—this dread disease on the wings of a mosquito hovers over our troops in foreign lands ready to take its toll of thousands upon thousands if and when their supplies of quinine are exhausted.

Quinine is a drug which is extracted from the bark of the cinchona tree and 90 per cent of the world's supply comes from the plantations of Java and other islands of the Dutch East Indies which are now in the hands of the Japanese. This means that no more quinine to speak of will be available to the United Nations as long as Java remains in the possession of our enemies.

That is why, ladies and gentlemen, if you stop at your neighborhood pharmacy tonight and ask for a dozen 5-grain quinine pills for your cold, your pharmacist will tell you:

"I'm sorry, but for the duration you will have to use something else. I have set aside a small amount of the quinine in my prescription room for the treatment of the few cases of malaria which we have in this com-

munity, and I have turned over the rest of my supply for the use of the Army."

Thus are pharmacists helping to solve the problem of obtaining quinine for the armed forces. No longer is this drug being used in cold remedies, in tonics, in hair preparations, or in sunburn preventives—today, and for the duration, pharmacists are dispensing quinine only for the treatment of malaria.

A preliminary study has indicated that there are approximately 200,000 ounces of quinine and quinine salts in unopened containers in the prescription rooms of the pharmacies of the country and this stock is being rapidly collected through the wholesale druggists of the country.

There is a great deal more quinine in opened packages in these prescription rooms, and we are now studying ways and means of collecting it; as a matter of fact, the Philadelphia College of Pharmacy and Science is at present conducting an experimental collection of such quinine from the pharmacies in Pennsylvania. When we collect quinine in containers which have been opened, the drug must be carefully analyzed and standardized before it can be used with safety, and the task of analyzing thousands of samples would be extremely expensive to the Government. The Philadelphia College has volunteered its facilities and contributed the services of its faculty experts to receive the quinine, analyze it and standardize it to proper strength. If this plan works satisfactorily in Pennsylvania, it will be expanded to cover the country at large and the colleges of pharmacy will be asked to assume the responsibility of collection and standardization.

It has been stimulating to see quinine by the thousands of ounces pour into the Philadelphia College as the voluntary contributions of the pharmacists of that state. The pharmacists of the other 47 states are eagerly awaiting the opportunity to turn in their quinine stocks in a similar manner.

In addition, specially trained pharmacists are coöperating in the development and introduction of totaquine, a mixture of the alkaloids of cinchona extracted from low-grade barks obtained from Central and South America. This new antimalarial drug will shortly be marketed for use in the malaria areas of the United States to free still more quinine for the Army.

Quinine is one of many drugs which were produced in lands now in the hands of our enemies and which are now practically or entirely unobtainable. The profession of pharmacy is cooperating with the Bureau of Plant Industry of the United States Department of Agriculture in studying the possibility of cultivating some of these drugs in this country. In the case of other drugs, the test tube and the retort of the pharmaceutical research worker are fast providing replacements. When the war between China and Japan cut off our supplies of ephedrine a few years ago, pharmaceutical research tackled the problem and produced a synthetic ephedrine which is fully as effective as the natural drug. We may look for many other new synthetic drugs to be born of the present emergency, for the necessities of the war are a tremendous stimulus to research.

Many other materials used in pharmacy are becoming short because they are also used in the production of necessary war materials. Alcohol, for example, is extensively used in the preparation of drugs and medicines and alcohol is also a prime necessity in the production of smokeless powder, synthetic rubber and other articles of war. Pharmacists today are doing everything within their power to economize in their use of this critical solvent. Up for special study is the use of ethyl alcohol in rubbing alcohol compounds, and pharmacy is studying the advisability of using isopropyl alcohol for this purpose. Isopropyl alcohol is not needed by the war industries and many hospitals have been using it in rubbing alcohol compounds for years.

I call your attention to these instances, not alone to explain a few of the difficult problems which pharmacists are meeting during this emergency, but to urge your sympathetic coöperation with your neighborhood pharmacist when he explains that he cannot sell you quinine pills, if he should recommend an Isopropyl Alcohol Rubbing Compound in place of the rubbing alcohol you have used in the past, urges you to use a hand lotion which contains no glycerin, or refuses to sell you a tube of toothpaste unless you turn in an empty used tube.

A TWO-FOLD PROBLEM

Bear in mind that pharmacy's task in this emergency is twofold. We must meet the needs of the armed forces for trained pharmacists and for drugs and medicines, but we must do so without depriving any community of essential pharmaceutical service. You can discontinue the

manufacture of such products as electric refrigerators, home radios and typewriters, but you cannot discontinue the manufacture of drugs and medicines for the duration. Nor can you ration drugs and medicines to civilians; there must be an ample supply of essential pharmaceuticals available in every community at all times to meet any medical need. Disease is seldom, if ever, conquered in the true sense of the word—rather, it is merely kept under control by the intelligent use of drugs and medicines. Without them the plagues of bygone generations once again would ravage the civilized world.

For every man in uniform there are more than a dozen men and women at home making the planes, tanks, guns, ammunition and other supplies which are needed at the front. The health of this "army behind the army" is of the greatest importance, for just as the soldier who is bedridden with malaria cannot get up and fight, so also the worker who is confined to bed with a cold, an infected foot or an intestinal upset, cannot be on the job turning out material necessary to the war effort. The "war of production" in which civilians are now engaged demands the highest standard of civilian health and it is the pharmacist, working with the physician and members of the other health professions, who must shoulder part of the responsibility of keeping the American worker on the job physically strong and mentally alert.

It is estimated that a million workers are absent from work every day because of illness. This means the full time of a million workers a year—figure out what this means in terms of planes, ships and ammunition which they could have produced had they been on the job. A glance at the list of causes of their illness shows that many of them are preventable—colds and other respiratory infections, illness resulting from unwise diets, contagious diseases contracted through careless exposure, toothaches and other dental disorders, and infections resulting from the neglect of minor cuts and scrapes. With our country engaged in an "all-out" war, we cannot afford the "luxury" of these ailments. It is your job to keep well this winter as never before. The troops in the Solomons, Australia, Alaska and Ireland are depending upon a physically strong, mentally alert army of workers on the job every day to supply them with the materials they need to meet the enemy. You must keep working to "keep 'em flying."

PERSONNEL PROBLEM

Pharmacists by the thousands have enlisted and have been conscripted. About one-tenth of the total number of those in practice will be in the armed forces before the end of 1942. The profession has coöperated with Selective Service officials in the judicious drafting of men in practice in order to take those who can best be spared by their communities and, so far as is possible, to leave no neighborhood without the protection of adequate pharmaceutical service and no manufacturing plant or health department without pharmacists. Special committees have been appointed in many states to help the armed forces obtain the pharmacists they need but to obtain them without jeopardizing civilian needs any more than is necessary. The State Pharmaceutical Associations are rendering yeoman service in this matter.

Those who remain in civilian practice must serve longer hours and must take over the work of those who are called away. Many pharmacists who had retired or had entered other activities are being called back to fill the gaps which will be more numerous as the emergency develops.

To train pharmacists as rapidly as possible to meet the needs of the Army and Navy and the civilian public, the colleges of pharmacy of the country are operating on an accelerated basis. By eliminating vacations and carrying full schedules, students of pharmacy today are completing four years of study in three years.

The withdrawal of a large number of physicians from civilian practice to meet the needs of the armed forces is creating a real problem in many communities—a problem which pharmacists are eager to help solve. A few physicians now must carry the work of many, and everyone must help them do it. Nonessential visits must be eliminated so that the doctor will have the time to make his really necessary calls. This means: Don't call a doctor unless you have to—and take care of your health so you don't have to. Carelessness and neglect of your health will waste needed working time, necessary drugs, and the already hard-pressed services of your neighborhood physician. Conserve food, gas and tires, to be sure, but conserve your health at all costs.

In spite of the scarcity of certain drugs and the shortage of personnel in our field, however, let me assure you that emergency or no emergency, there will be no compromise with the *quality* of the phar-

THE WHITE HOUSE
WASHINGTON

October 2, 1942

Dear Doctor Cook:

On the occasion of the observance of National Pharmacy Week, I am pleased to extend my greetings to the members of the American Pharmaceutical Association. National Pharmacy Week serves a useful purpose in calling attention to the contribution that pharmacists have made in the nation's war effort.

I am grateful for the fine work accomplished by the members of your association and I look forward with confidence to their continued support.

Very sincerely yours,

Franklin D. Roosevelt

Dr. Roy Bird Cook,
President,
The American Pharmaceutical Association,
1559 Lee Street,
Charleston, West Virginia.

maceutical service you receive. The State Boards of Pharmacy of this country view any suggestion of lowering our standards of education and training of personnel or "cutting corners" on the purity, quality and strength of drugs and medicines as a grave menace to public health, and there will be none of it. You may be inconvenienced by the *quantity* of pharmaceutical service available in your community, but you will never be subject to any lowering of its *quality*.

A few days ago, I received the following letter from our President, Franklin Delano Roosevelt:

"On the occasion of the observance of National Pharmacy Week, I am pleased to extend my greetings to the members of the AMERICAN PHARMACEUTICAL ASSOCIATION. National Pharmacy Week serves a useful purpose in calling attention to the contribution that pharmacists have made in the nation's war effort.

"I am grateful for the fine work accomplished by the members of your association and I look forward with confidence to their continued support."

In reply, Mr. President, may I say that pharmacy has enlisted in this war—in the fighting forces at the front and in the maintenance forces at home. The personnel, supplies and facilities of the profession are pooled in one common cause: To keep the soldier and sailor healthy and to keep the American people healthy. Everything else has been subjugated to this one purpose.

National Pharmacy Week in 1942 finds a profession in uniform—the khaki blouse of the Army, the blue jacket of the Navy, and the white coat of civilian practice. Every man is doing his small job to the best of his ability—looking forward with you to the day when once again we will enjoy the peace and freedom of our democracy.

NEW REVENUE BILL PROVIDES DRAWBACK ON ALCOHOL EXCISE TAX

CONGRESS RECOGNIZES APPEAL OF PHARMACISTS FOR LOWER TAX ON ALCOHOL USED IN THE PREPARATION OF MEDICINES

IN THE Revenue Act of 1942, the Congress of the United States has at last recognized the appeal of retail pharmacists for relief from high excise taxes on ethyl alcohol used in the preparation of drugs and medicines. Although not granting pharmacists an outright differential, the Act provides that persons using tax-paid alcohol in the manufacture or production of medicines and medicinal preparations may, upon payment of a special license fee, receive a drawback of $3.75 per proof gallon.

Under the new tax law, ethyl alcohol is taxed at $6 a proof gallon. The drawback of $3.75 per proof gallon will mean that ethyl alcohol will cost the pharmacist who applies for and is granted the drawback $2.25 net per proof gallon. The special fee which must be paid by the pharmacist will be as follows: for total annual withdrawals of 25 proof gallons or less a year, $25; for total annual withdrawals of 25 to 50 proof gallons a year, $50; for total annual withdrawals of more than 50 proof gallons, $100.

Alcohol is taxed by the Treasury Department on the basis of proof gallons. The term a "proof gallon" means a wine gallon of 100 proof alcohol which contains 50 per cent by volume of absolute alcohol. An alcohol which contains 100 per cent by volume of absolute alcohol would thus be 200 proof and a wine gallon of it would be equivalent to 2 proof gallons. Alcohol U. S. P. contains 94.9 per cent by volume of absolute alcohol and thus one wine gallon of alcohol as purchased and used by the pharmacist is 189.9 proof, or the equivalent of 1.89 proof gallons. A license fee of $25 on the purchase of 25 proof gallons of alcohol is, therefore, the equivalent of a $25 fee on about 13 wine gallons of Alcohol U. S. P., and a drawback of $3.75 per proof gallon is the equivalent of a drawback of about $7.00 per wine gallon of Alcohol U. S. P. Thus, if a pharmacist uses 13 wine gallons of Alcohol U. S. P. in a year, the drawback he receives on the first 3½ gallons of alcohol he buys will pay his license fee of $25 and he will obtain a net benefit of the drawback on the remaining 9½ gallons amounting to over $60.

The law provides that the drawbacks shall be paid quarterly upon the filing of a claim with the Commissioner. Regulations will be issued within the next few weeks by the Alcohol Tax Unit of the Treasury Department.

Complete text of the section of the new law relating to the drawback is as follows:

"Any person using distilled spirits produced in a domestic registered distillery or industrial alcohol plant and fully tax-paid in the manufacture or production of medicines, medicinal preparations, food products, flavors, or flavoring extracts which are unfit for beverage purposes and are sold or otherwise transferred for use for other than bever-

age purposes upon payment of a special tax per annum, shall be eligible for drawback as hereinafter provided for.

"Such special tax per annum shall be graduated in amount as follows: (*a*) for total annual withdrawals not exceeding 25 proof gallons, $25 per annum; (*b*) for total annual withdrawals not exceeding 50 proof gallons, $50 per annum; (*c*) for total annual withdrawals of 50 proof gallons or more, $100 per annum.

"*Requirements.*—Such person shall register annually with the Commissioner; keep such books and records as may be necessary to establish the fact that distilled spirits purchased by him and fully tax-paid were used in the manufacture or production of medicines, medicinal preparations, food products, flavors, or flavoring extracts which were unfit for use for beverage purposes; and shall be subject to such rules and regulations in relation thereto as the Commissioner, with the approval of the Secretary, shall prescribe to secure the Treasury of the United States against frauds.

"*Investigative Powers of Commissioner.*—The Commissioner, for the purpose of ascertaining the correctness of any claim filed under this subsection is authorized, by any officer or employee of the Bureau of Internal Revenue, including the field service, designated by him for that purpose, to examine any books, papers, records, or memoranda bearing upon the matters required to be alleged in the claim, and may require the attendance of the person filing the claim or of any officer or employee of such person, or the attendance of any other person having knowledge in the premises, and may take his testimony with reference to any matter covered by the claim, with power to administer oaths to such person or persons.

"*Drawback.*—A drawback at the rate of $3.75 on each proof gallon shall be allowed on distilled spirits tax-paid and used as provided in this subsection and be due and payable quarterly upon filing of a proper claim with the Commissioner. No claim under this subsection shall be allowed unless filed with the Commissioner within the three months next succeeding the quarter for which the drawback is claimed."

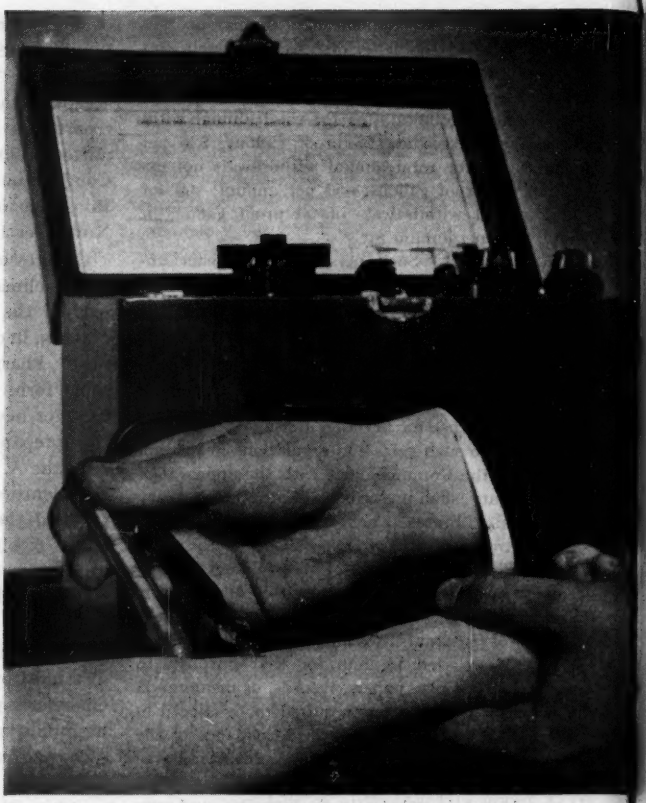
The drawback provision was added as an amendment to the Tax Bill in the U. S. Senate by Senator Millard Tydings, of Maryland. Senator Tydings, with Senator Radcliff, of Maryland, defended the amendment on the floor of the Senate and in Committee meetings over the objections of the Treasury Department and it was a part of the Bill as enacted by the Senate. Since the provision did not appear in the Bill as it was previously passed by the House of Representatives, the matter had to be considered by a Conference Committee of the House and Senate which adjusted differences between the two bills. The representatives of the House accepted the provision and it was favorably reported to Congress by the Conference Committee on October 20. The Act was passed by Congress on October 20 and signed by President Roosevelt on October 21 to become effective November 1.

Congressional approval of the drawback provision climaxes several years of effort on the part of the AMERICAN PHARMACEUTICAL ASSOCIATION, in coöperation with the N. A. R. D. and State Pharmaceutical Associations, to secure some form of tax differential between alcohol used for beverage purposes and alcohol used for the preparation of medicinals. As early as 1938 the A. PH. A. passed resolutions urging the consideration of Congress to the injustice of the tax and the ASSOCIATION has never ceased its efforts to obtain such relief. As the lower tax is reflected in the price of drugs and pharmaceuticals it should lower the cost of medicines to the public.

Enactment of the drawback provision comes at a most opportune time for during the present emergency pharmacists are being faced with the desirability, if not the necessity, of preparing more and more of their own pharmaceuticals.

A recent order of the War Production Board prohibits distillers from making 190 proof alcohol for beverage purposes and thus retail liquor stores will be unable to obtain and sell alcohol as they have in the past. Pharmacists who formerly purchased alcohol by the pint from liquor shops will now have to buy it through wholesale channels by the gallon.

The drawback arrangement conveys a real privilege upon practicing pharmacists and the profession must measure up to its responsibilities by maintaining the strictest vigilance against diversion of any kind. Congress has recognized the justification of taxing medicinal alcohol on a different basis than beverage alcohol is taxed but there is a real question in the minds of many members of the government as to whether or not such a system can be maintained without abuse. Pharmacists must answer this question decisively in the affirmative by the manner in which they handle the alcohol they purchase. The pharmacist's splendid record in the matter of narcotic drugs must be duplicated in the case of ethyl alcohol.



THE pH OF OINTMENTS

RECENTLY PUBLISHED PAPER BY BRITISH DERMATOLOGIST SUGGESTS USE OF CREAMS, AND OINTMENTS WHICH TAKE INTO CONSIDERATION THE ACID MANTLE OF THE SKIN

THE aim of medication is to assist and support the human body in its attempts to throw off disease and, thus, a cardinal rule in all therapeutics is to avoid the use of any medicament which would interfere with normal functions of the affected part. Therefore, since the surface of the skin is bathed with an aqueous fluid which normally is slightly acid, but which in the presence of disease may become either abnormally acid or alkaline, shouldn't ointments, creams and lotions which are to be applied to the skin take this factor into consideration?

Ralph G. Harry, F.I.C., Certificate of the Institute of Chemistry in Foods, Drugs, Pharmacology and Therapeutics, believes they should, and in a comprehensive 22-page article appearing in *The British Journal of Dermatology and Syphilis* (54:1, Jan., 1942, 1–22) he explains why.

Although the role of the skin's "acid mantle" is not known, Mr. Harry believes that in the absence of convincing proof to the contrary, external preparations should be formulated in such a way as not to interfere with its function, whatever that may be.

He cites the fact that sweat has been found by other investigators to be bactericidal and fungicidal, and, furthermore, he reasons that since the normal skin swarms with various organisms, including staphylococci, diphtheroids and monilia, without being diseased, it is logical to assume that the skin surface must possess an antibacterial activity of some sort which reduces the pathogenicity of the organisms without destroying them. He believes that the "acid mantle" of the skin may preserve the protective factors of the skin and that an unfavorable *p*H might impair them.

Mr. Harry calls attention to the findings of other investigations which show that skins which are incapable of neutralizing alkali solutions placed upon them are more easily sensitized to external allergens and that alkalinity is an im-

portant factor in the production of eczema by soap. He points out that acids can also irritate the skin, perhaps through the hydration and swelling of proteins.

In addition to the possible influence of *p*H on the defensive processes of the skin, Mr. Harry states that the respiration of the skin has been termed a more accurate measure of its vitality than any other of its functions and it has been found that deviation of its *p*H from normal is reflected in a lowered tissue respiration.

Not much is known as yet concerning the abnormal *p*H of diseased skin but the clinical use of buffered ointments, creams and lotions may serve to correct an abnormal *p*H, making the prevailing conditions unsuitable for the growth of bacteria. Until recently most emulsifying agents were largely soaps which were incapable of being rendered neutral or acid, but the newer materials make it possible to adjust these preparations to varying degrees of acidity or alkalinity within the limits which would be desired.

Mr. Harry has found that the normal *p*H of exposed skin may range from 4.2 to 5.6, with an average of from 5.3 to 5.6.

FORMULAS OF DEFINITE pH

In his article, Mr. Harry gives a number of formulas for dermatological creams of definite *p*H value, as determined with the dip-type glass-calomel electrodes and vacuum tube potentiometer.

The general method of compounding these creams is the usual procedure of dissolving all of the fat-soluble constituents and the emulsifier, and heating to 70° C.; pouring this mixture into the distilled water containing all of the water-soluble constituents (which has been heated to 70° C.); and stirring rapidly until the mixture thickens and the temperature falls to about 40° C. The cream may then be left until cold and then be well mixed. Medicaments may be dissolved in whichever phase they are soluble before emulsification. Liquid creams should be homogenized.

In a number of the formulas Mr. Harry used Lanette wax SX, a product not obtainable in the United States but which, according to E. I. Du Pont de Nemours, its former producers, can be approximated by the following combination:

Cetyl alcohol flakes	9 parts
Duponol C (Du Pont)	1 part

Lanette wax is recommended by Mr. Harry for use in neutral or acid creams. His formulas follow:

Lanette wax SX	5
Cetyl alcohol	10
Glycerin	5
Distilled water	80
Preservative, *q. s.*	

*p*H = 6.6

By adding citric acid and increasing the proportion of the emulsifier, a low *p*H is readily obtained:

Lanette wax SX	15.0
Mineral oil	5.0
Glycerin	5.0
Citric acid	0.1
Distilled water	74.9
Preservative, *q. s.*	

*p*H = 2.6

BUFFERED CREAMS

For buffered creams more emulsifier is usually required, owing to the effect of the dissolved salts. To obtain the required *p*H and buffering effect, a 2.101 per cent citric acid solution and a 7.165 per cent sodium phosphate solution are used. Both solutions should be made with distilled water and with chemicals of analytical reagent quality.

Lanette wax SX	20.0
Mineral oil	5.0
Glycerin	5.0
Sodium phosphate solution	31.2
Citric acid solution	35.5
Distilled water	3.3
Preservative, *q. s.*	

*p*H = 4.6

Lanette wax SX	20.0
Mineral oil	5.0
Glycerin	5.0
Sodium phosphate solution	38.7
Citric acid solution	28.0
Distilled water	3.3
Preservative, *q. s.*	

*p*H = 5.4

Lanette wax SX	20.0
Mineral oil	5.0
Glycerin	5.0
Sodium phosphate solution	48.5
Citric acid solution	18.2
Distilled water	3.3
Preservative, *q. s.*	

*p*H = 6.4

The above buffered creams cover the ranges of *p*H which are most likely to interest the dermatologist. The incorporation of a medicament will change the *p*H if it is itself an acid or alkali, but in most cases the substances prescribed by dermatologists are not likely to affect the *p*H of these bases to any great extent. If the medicament is water-soluble, it may be dissolved in the mixed buffered solution.

SORBITAN MONOLAURATE

Sorbitan monolaurate[1] produces stable liquid emulsions and imparts a smooth feeling to the product.

Sorbitan monolaurate	10
Mineral oil	20
Distilled water	70
Preservative, *q. s.*	

*p*H = 6.54

STEARATES

The use of stearic acid in vanishing creams is well known. Newer products use glyceryl monostearate, diglycol stearate or propylene glycol stearate.

Glyceryl monostearate[1]	15
Mineral oil	5
Glycerin	5
Distilled water	75
Preservative, *q. s.*	

*p*H = 7.7

Diglycol stearate[1]	15
Mineral oil	5
Glycerin	5
Distilled water	75
Preservative, *q. s.*	

*p*H = 6.78

Propylene glycol stearate[2]	15
Mineral oil	5
Glycerin	5
Distilled water	75
Preservative, *q. s.*	

*p*H = 6.81

GLYCOL LAURATES

Diglycol laurate produces a stable liquid emulsion by simple agitation. The following formula, for example, yields a thick "milk" if the diglycol laurate is shaken with the water and the mineral oil added with constant shaking. Rubefacients such as methyl salicylate or camphor (for chapped hands) may be added by replacing a portion of the oil with the medicament.

Diglycol laurate[1]	20
Mineral oil	60
Distilled water	q. s.

*p*H = 7.6 to 8.5

Propylene glycol laurate and diethylene glycol monolaurate produce excellent emulsions by simple dispersion and homogenization or by agitation.

Propylene glycol laurate[1]	16
Mineral oil	23
Distilled water	61
Preservative, *q. s.*	

*p*H = 7.62

Diethylene glycol monolaurate[1]	16
Mineral oil	16
Distilled water	68
Preservative, *q. s.*	

*p*H = 8

These emulsions are slightly alkaline and are excellent cleansing agents, particularly useful to those whose skin is sensitive to soaps. They are oil-in-water emulsions and can be easily removed with water. Mildly alkaline lotions have been found to give relief in certain pruritic conditions.

AMINO-STEARATE EMULSIONS

Where mild alkalinity is not objectionable, triethanolamine in combination with stearic acid may be used.

Stearic acid	3
Mineral oil	20
Triethanolamine[2]	1
Distilled water	76
Preservative, *q. s.*	

*p*H = 8.25

CHOICE OF EMOLLIENT

The choice of the emollient for an ointment or cream depends upon the degree of penetration desired. The animal and vegetable oils and fats, oleic acid, lard, goose-grease, lanolin and cod-liver oil are readily absorbed by the skin, while mineral oil is not. Mr. Harry suggests the possibility that the penetration of various oils may be related to their oleic acid content; oils having the highest oleic acid content providing the greatest penetration. He lists average figures for typical oils.

Oil	Oleic Acid Content, Per Cent
Almond	77
Apricot kernel	65
Avocado pear	80
Arachis	60–70
Blepharis edulis	73
Caper spurge seed	92
Cashew nut	74
Cottonseed	23–35
Linseed	8–12
Macassar	61
Olive	80–85
Raisin seed	32–44
Sesame	38–48
Soya bean	25–33
Tea seed	83
Walnut	17–28

PRESERVATIVES

Mr. Harry recommends the use of esters of parahydroxybenzoic acid as preservatives for creams, ointments and lotions. The activity of the esters increases from the methyl, propyl, butyl to the benzyl, but their solubilities decrease in the same order. If a single ester is to be used, the author suggests 0.15 to 0.2 per cent of methyl parahydroxybenzoic acid, but he has found that a mixture of the esters apparently exerts a synergistic action against a wider range of microörganisms. For such a mixture he suggests the following:

Methyl parahydroxybenzoic acid..0.15 per cent
Propyl parahydroxybenzoic acid..0.05 per cent
Butyl parahydroxybenzoic acid...0.02 per cent

The three esters are dissolved in distilled water from which any absorbed carbon dioxide has been previously removed by boiling for 10 to 15 minutes. The resulting solution when cold may be filtered, if not absolutely clear. Its *p*H is approximately 6.6 and it may be used to replace the distilled water in any standard formula.

Parachlormetacresol, 0.1 to 0.2 per cent, is satisfactory for creams and lotions.

Trouble is often encountered from growths which start on the underside of the covers of the jars in which the creams are packaged. The remedy lies in the use of insets which have been treated with a preservative or the use of waxed liners in the caps.

HUMECTANTS

To maintain the water content of a preparation despite variations in temperature and humidity, a humectant is used. Glycerin, 5–10 per cent; *d*-sorbitol, and the monoethyl ester of diethylene glycol are satisfactory.

[1] Available from Glyco Products, Inc., 230 King St., Brooklyn, N. Y.
[2] Available from The Goldschmidt Corp., 153 Waverly Pl., New York, N. Y.
[3] Available from Carbide and Carbon Chemicals Corp., 30 E. 42nd St., New York, N. Y.

N. F. VI WAR STANDARDS TO BE CONTINUED IN N. F. VII

The Committee on National Formulary, at its annual meeting held in Pittsburgh, Pa., October 2 and 3, 1942, voted to continue the special war standards for certain official preparations which were issued as Interim Revisions to N. F. VI. Since N. F. VII becomes official on November 1, succeeding N. F. VI, it is necessary to reaffirm these emergency measures as Supplements to the new edition. The recommendation of the N. F. Committee is now before the council of the A. PH. A. and an official notice will be made shortly. Involved are the following permissive deviations from the official formulas:

(1) Replacement of Cudbear by Amaranth in N. F. VII Preparations.
(2) Replacement of Extract of Belladonna by Extract of Strammonium in Compound Pills of Cascara.
(3) Replacement of Oil of Lavender by Oil of Cedar Leaf in N. F. VII Preparations for External Use.
(4) Replacement of Elixir of Iron, Quinine and Strychnine by Elixir of Iron and Strychnine.
(5) Omission of Quinine Hydrochloride from Compound Elixir of Glycerophosphates.
(6) Omission of Quinine from Compound Syrup of Hypophosphites.
(7) Replacement of Elixir of Iron, Quinine and Strychnine Phosphates by Elixir of Iron and Strychnine Phosphates.
(8) Omission of Orange Flower Water from National Formulary Preparations.

The N. F. Committee has also recommended the Council's approval of the following changes in official standards, made necessary by the war:

(1) Omission of Oil of Dwarf Pine Needles from Jelly of Ephedrine Sulfate.
(2) Replacement of 8 Gm. Rectified Oil of Birch Tar by 2 Gm. of Juniper Tar in Compound Ointment of Resorcinol.
(3) Replacement of Valerian by Indian Valerian.

Harris & Ewing

FEDERAL SECURITY AGENCY
U. S. PUBLIC HEALTH SERVICE
WASHINGTON (BETHESDA STATION)

IN REPLYING
ADDRESS THE SURGEON GENERAL
U. S. PUBLIC HEALTH SERVICE

October 12, 1942

Since the passage of the Venereal Disease Control Act in 1938, the importance of the pharmacist as a factor in the control of the venereal diseases has achieved increasing recognition. This is to be expected because the pharmacist is usually the first to be consulted by those who have, or suspect they have, a venereal disease.

The pharmacist himself is more aware than anyone else of his responsibility to the community in assisting the health authorities in this most urgent task of bringing venereal patients under proper treatment. Through his professional organizations, notably the American Pharmaceutical Association, and with the cooperation of the American Social Hygiene Association, the pharmacist has demonstrated an active willingness to participate in the national program for the control of syphilis and gonorrhea.

Today, the need for protecting the Nation's manpower from venereal infections calls for redoubling the efforts of all forces engaged in this vital public health problem. For this reason, the U. S. Public Health Service has prepared the attached statement clarifying the role of the pharmacist from the public health viewpoint in the control of venereal diseases, and to reemphasize his importance in the community as an educator, a personal influence, and a citizen.

Sincerely yours,

Thomas Parran
Surgeon General

THE PHARMACIST AND VD CONTROL

NATION'S NEED FOR PROTECTING ITS MANPOWER CHALLENGES THE PHARMACIST TO HELP HOLD VENEREAL DISEASE IN CHECK

THE physician-pharmacist relationship which has existed in this country for many generations is more than a mere tradition. It is rather a natural outgrowth of the close inter-dependence between physician and pharmacist in a common endeavor, namely, that of healing the sick. Thus, both the pharmacist and the physician bear a joint responsibility to society—to the people whose well-being depends greatly upon their intelligent coöperation.

Within this triangular picture of the pharmacist, the physician and the people are the numerous public health services whose broad function it is to serve the health needs of the community of federal, state and community levels.

The war effort has pointed up the individual responsibilities of these allied health forces, and at the same time has strengthened their interrelationships in the united drive against diseases which sap our national strength.

Foremost among wartime health problems are the venereal diseases, which in World War I caused seven million days lost from service in the U. S. Army. As for the population generally, one person out of every 42 has syphilis now! Although the actual prevalence of gonorrhea is not known, it is estimated that it strikes from three to seven times as often as syphilis!

A nation-wide effort to eradicate syphilis and gonorrhea through a program of effective control is being coördinated by the U. S. Public Health Service. With funds appropriated by the Congress, and state, city and county health departments, full-time professional venereal disease control workers have instituted vigorous measures to deal with the VD problem in every community. But no health control project can be termed effective without the aid of the pharmacist.

Given a national and a community VD control plan, how can the pharmacist serve within the framework of the triangle described above? An attempt has been made in the following outline to define in broad scope the responsibility of pharmacists in the VD control effort.

THE PHARMACIST AS AN EDUCATOR

The pharmacist is an important influence in preventing the spread of venereal diseases, because persons who have these infections frequently go to him for advice or medicine. The pharmacist can make clear to the public that venereal diseases are dangerous, and that to act on the assumption that they are a trifling matter is more dangerous still. He can call on the state or local health department or the State Pharmaceutical Association for a supply of easy-to-read literature—attractive folders, leaflets, pamphlets, etc.—for free distribution to customers. He can avail himself of colorfully and effectively designed posters from his state or local health department for display in his window or elsewhere in the drugstore. He can secure the ready advice and cooperation of such agencies as the Joint Committee of the AMERICAN PHARMACEUTICAL ASSOCIATION and the American Social Hygiene Association, the National Association of Retail Druggists and the U. S. Public Health Service. Education is a vital arm in the prevention and control of venereal diseases. The pharmacist is excellently placed to serve an educational role in the community.

THE PHARMACIST AS A PERSONAL INFLUENCE

The man who has (or thinks he has) a venereal disease, and consults his pharmacist rather than a physician, is usually laboring under a misconception that the disease is not serious enough to warrant a physician's attention; or that he can obtain just as effective treatment more cheaply by using a proprietary ("patent") preparation sold without a prescription. In either case, he is asking the pharmacist, "What should I do about my ailment?"

In such a situation, the very presence of a venereal disease victim in a drugstore is fair testimony of the customer's strong personal confidence in the pharmacist. The pharmacist can easily enhance this confidence and add to his good will by exerting his personal influence to guide the customer on the proper course. He can point out the serious

character of venereal diseases and the necessity of protecting the individual and the community. He can explain that it is always dangerous to treat oneself with a so-called remedy or nostrum and assume that one has been cured of syphilis or gonorrhea. He can refer customers who ask for such products to a reputable physician or to a clinic which provides diagnosis and treatment for venereal diseases. He can emphasize that the customer may have a different disease, requiring different treatment from the one he thinks he has or that he may not even have any disease; that a physician is trained to diagnose these diseases with the aid of physical examinations and technical laboratory tests. The pharmacist who knows the dangers of venereal diseases and yet continues to diagnose them or recommend or sell remedies for their self-treatment does more than violate a fundamental ethic of his profession. He becomes a contributor to whatever disastrous results may follow improper treatment or neglect.

THE PHARMACIST AS A CITIZEN

As a citizen, it behooves the pharmacist to help further the venereal disease control effort in his community by urging and supporting state and local legislation designed to lower the incidence of syphilis and gonorrhea. In some states, the pharmacist can enlist in the legislative campaigns sponsored by his own pharmaceutical organizations, by the American Social Hygiene Association, and by other health and civic groups, in promoting the enactment of premarital and prenatal laws for blood tests for syphilis. He should familiarize himself with all these activities. He can support legislation opposing advertising of fake cures by quack doctors, and prohibiting the sale of remedies for venereal diseases except by a physician's prescription. He can join the front line forces that are fighting for stricter laws and repressive measures against prostitution. As a citizen, he can insist on adequate treatment facilities for venereal disease control in his community. Adequate facilities mean sufficient clinics that function at convenient hours at night as well as in the morning and afternoon.

By participating actively in the venereal disease control program being promoted by the United States Public Health Service and state health authorities, and by the Joint Committee of the American Social Hygiene Association and the AMERICAN PHARMACEUTICAL ASSOCIATION, pharmacists of the country will strengthen public confidence in their profession. At the same time they will know personally that their best efforts are being given toward the elimination of the venereal disease scourge, both for the best interests of the civilian population and for the greater fighting efficiency of the armed forces of the nation.

U. S. P. XII PACKAGING AND LABELING REQUIREMENTS DEFERRED, MODIFIED FORMULA FOR ELIXIR OF PHENOBARBITAL DURING WAR

THE U. S. P. Committee of Revision is now giving consideration to two important proposals which it is believed will go into effect before November 1st next, when the standards of the new Pharmacopœia become official.

Because of the relatively short time between the appearance of the U. S. P. XII and the enforcement date of November 1, 1942, and especially because of the many difficulties brought about by the war and the desire to avoid the loss of valuable materials and stocks of labels, bottles, and finished packages, it is proposed that the enforcement of the new packaging and labeling requirements of the U. S. P. XII shall be deferred until June 1, 1943.

Since the new U. S. P. requirements are chiefly for the purpose of adding further protection to physicians and the sick and none of the existing standards will be withdrawn, the Committee believes that no injury will come from this deferment but that it will be of material aid to manufacturers and dealers and prevent a serious loss of valuable materials.

Extensive studies of the Elixir of Phenobarbital formula have been made during the past five or more years and the new U. S. P. XII formula was believed to be a decided improvement over the original or the revised formulas of the N. F. VI.

However, since the U. S. P. XII formula requires a marked increase in glycerin, and since glycerin is a war necessity and available only in limited amounts, it is proposed to adopt for the Pharmacopœia the original formula of the sixth Edition of the National Formulary for the period of the war or until the order is rescinded by official action.

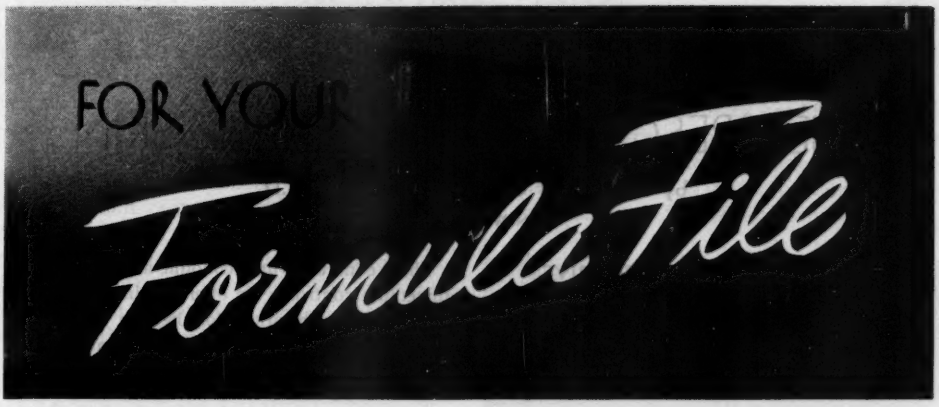
The proposed formula is as follows:

ELIXIR PHENOBARBITALI
Elixir of Phenobarbital
Elix. Phenobarb.

Elixir of Phenobarbital contains, in each 100 cc., not less than 0.37 Gm. and not more than 0.42 Gm. of phenobarbital.

Phenobarbital	4 Gm.
Tincture of Sweet Orange Peel	30 cc.
Solution of Amaranth (1 per cent)	10 cc.
Alcohol	175 cc.
Glycerin	235 cc.
Syrup	350 cc.
Distilled water, a sufficient quantity,	
To make	1000 cc.

Dissolve the phenobarbital in the alcohol; add the tinctures, the glycerin, the syrup, and sufficient distilled water to make the product measure 1000 cc. Mix well and filter, if necessary, to make the product clear.



A GROUP OF FORMULAS REFERRED TO IN RECENT ARTICLES IN MEDICAL JOURNALS . . . . FORMULAS YOU SHOULD HAVE AT HAND FOR PRESCRIPTION USE

PHYSICIANS, reading clinical reports in leading medical journals of the country, find references to a number of preparations with which they are unfamiliar. Many of such preparations are referred to by the name of the individual who first reported their use in the literature, while others bear no designation other than a therapeutically descriptive title. The formulas for these preparations are not found in such formularies as are in general use, most of them being too new for such compendia, and unless an individual has access to a large number of medical journals, he is at a loss to supply the particular preparation.

To bridge this gap, THIS JOURNAL will endeavor to provide pharmacists with a record of various formulas as they appear from time to time in the medical literature. The first group of such formulas is as follows:

STRICKLER'S SOLUTION

Iodine crystals	1.3 Gm.
Potassium iodide	1.9 Gm.
Salicylic acid	1.9 Gm.
Boric acid	3.8 Gm.
Alcohol, 50 per cent, *q. s.*	60.0 cc.

Described by C. F. Lehmann, M.D., in the treatment of dermatophytosis (*J. A. M. A., 119: 18 (Aug. 29, 1942), 1470*).

Dr. Lehmann uses the following modification of this formula at Brooke General Hospital, Fort Sam Houston, Texas:

Iodine crystals	1.16 Gm.
Potassium iodide	1.71 Gm.
Salicylic acid	1.71 Gm.
Boric acid	1.71 Gm.
Alcohol, 95 per cent, *q. s.*	60.00 cc.

McFARLAND'S METHYLROSANILINE SOLUTION

Methylrosaniline	6 Gm.
Alcohol	24 cc.
Water, *q. s.*	240 cc.

Described by C. F. Lehmann, M.D., in the treatment of dermatophytosis (*J. A. M. A., 119: 18 (Aug. 29, 1942), 1471*).

LEHMANN'S FOOT POWDER

Thymol	1 Gm.
Boric acid	10 Gm.
Zinc oxide	20 Gm.
Purified talc, *q. s.*	100 Gm.

Described by C. F. Lehmann, M.D., in the treatment of dermatophytosis (*J. A. M. A., 119: 18 (Aug. 29, 1942), 1471*).

INSECT BITE RELIEF

Ethyl Aminobenzoate	2 Gm.
Flexible collodion	15 Gm.

Dispense in bottle with rod in stopper. Keep away from flame. Keep tightly stoppered. Paint itching bite as required for relief.

Described by R. L. Sutton, Jr., M.D., as particularly effective for the relief of chigger bites, but of value for any type of insect bites. Should not be used on extensive areas (*J. A. M. A., 120: 1, (Sept. 5, 1942), 26*).

AN ANALYSIS OF THE PRESCRIPTION FOR THE SKIN

by HERMAN GOODMAN, B.S., M.D.
OF NEW YORK CITY

DISCUSSING 121 CONSECUTIVE PRESCRIPTIONS FOR THE SKIN AS PRESENTED TO ONE PHARMACY IN A PERIOD OF FIVE MONTHS

SINCE 1898, in New York State, the examination for the practice of medicine has not included tests on pharmacy or prescription writing. The colleges of medicine, in consequence, have not stressed this phase of medical practice. Several generations of physicians have not been trained to write any prescriptions. The increase in physical methods, the ultraviolet emanators, the x-ray, short wave, grentz ray, and others have displaced the written prescription for skin ailments. The improvement in cosmetics and the encroachment by beauticians, barbers, and purveyors of corrective cosmetics on the field of medicine we call dermatology, instead of dermatopathology, has made the physician conscious of his shortcomings in designing dermatologic prescription preparations. He hesitates to compete with the finished products of the manufacturer which lie on the counter of the pharmacy. The advertising agency impresses him with the value of products with trade names that are easy to remember, and easier still to write. There is a growing tendency for dispensing under one or another guise: as coded prescriptions, products with pharmacy labels delivered to the patient at the specialist's office, one-pharmacy prescriptions, and the like.

Dr. Goodman is the author of *Rational Pharmaceutical Treatment of Common Skin Diseases, Cosmetic Dermatology, Your Skin and Your Health,* and many other texts on the subjects of dermatology and the therapy of skin ailments. He has contributed widely to the journals of the medical and pharmaceutical professions.

These conditions are economic and beyond our immediate control. We offer for discussion, 121 consecutive prescriptions for the skin which were presented to one New York City pharmacy from August to December, 1939.

INTERNAL

There were five orders for internal medication which deserve mention. One physician actually wrote the ingredients for the alterative known as Mixed Treatment:

(1)	Bichloride of mercury.....	0.1
	Potassium iodide.....	8.0
	Sarsaparilla syrup.....	90.0
	Water, to make.....	180.0

A physician wrote an order for a proprietary Mixed Treatment pill. Two physicians ordered proprietary tablets of tin oxide, and another ordered a special proprietary mixture of vitamins A and D.

PROPRIETARY EXTERNAL

There were 24 formulas for external application which were orders on the pharmacist. All the clerk had to do was transfer from one jar to another. There were no directions for the pharmacist nor were there any directions for the label.

There were orders (6–12) for specialties from one or another pharmaceutical manufacturer. These were written in plain everyday English easily decipherable by the patient. They could be regarded as reminders rather than as prescriptions! They included such products as Kummerfeld (Doak), Sulfoform Spirits, Resinol Ointment, Calmitol Ointment, and Iodex.

ORDERS VS. PRESCRIPTIONS

The other 18 orders (13–30) on the pharmacist included three for potassium permanganate, one each for solution, 1:1000; tablets (no weight specified); and granules to one gram for both.

Four orders were for ammoniated mercury; one for 10 per cent; one for 5 per cent; one written as "mild"; and the fourth for three per cent ointment.

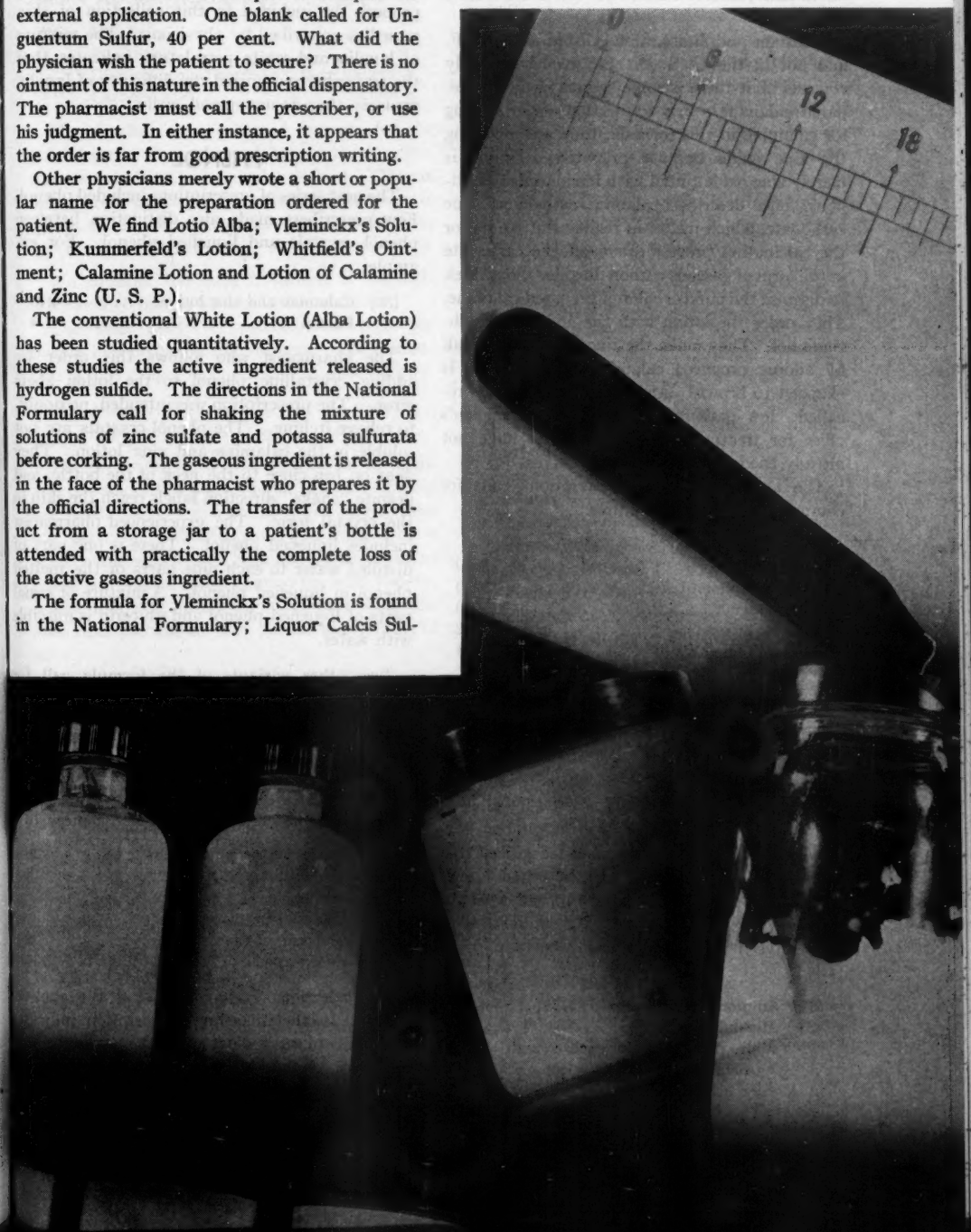
One physician wrote for an ounce of Lanolin; the blank of another called for Zinc Oxide Ointment; a third ordered Boric Acid Ointment, U. S. P. One order was for Spirit of Camphor for external application. One blank called for Unguentum Sulfur, 40 per cent. What did the physician wish the patient to secure? There is no ointment of this nature in the official dispensatory. The pharmacist must call the prescriber, or use his judgment. In either instance, it appears that the order is far from good prescription writing.

Other physicians merely wrote a short or popular name for the preparation ordered for the patient. We find Lotio Alba; Vleminckx's Solution; Kummerfeld's Lotion; Whitfield's Ointment; Calamine Lotion and Lotion of Calamine and Zinc (U. S. P.).

The conventional White Lotion (Alba Lotion) has been studied quantitatively. According to these studies the active ingredient released is hydrogen sulfide. The directions in the National Formulary call for shaking the mixture of solutions of zinc sulfate and potassa sulfurata before corking. The gaseous ingredient is released in the face of the pharmacist who prepares it by the official directions. The transfer of the product from a storage jar to a patient's bottle is attended with practically the complete loss of the active gaseous ingredient.

The formula for Vleminckx's Solution is found in the National Formulary; Liquor Calcis Sulfuratae. Neither the U. S. P., the N. F., nor the Dispensatory carries any formula for Kummerfeld's Lotion. The pharmacist has his choice of no less than three combinations of camphor, sulfur, tragacanth or acacia suspensions.

Whitfield's ointment is in the N. F. under the name of Ointment of Benzoic and Salicylic Acid.



Few physicians know that it was never offered by Whitfield for the treatment and cure of ringworm. Whitfield described the salicylic acid-benzoic acid combination in soft paraffin and cocoanut oil (the original formula) as a preliminary application to the thickened horny layer of tinea infested skin. Whitfield applied chrysarobin in ether, chloroform and acetone as the actual fungicide.

Calamine and Zinc Lotion is listed in the N. F. and not in the U. S. P. Physicians generally consider that there is some special virtue in prepared calamine. Few know that when writing for calamine in this formula, they are repeating the zinc oxide because prepared calamine is merely zinc oxide tinted with ferric oxide. Textbooks once described calamine as calcined zinc carbonate, which meant in reality zinc oxide, for the calcination process drove off the carbonate in the form of gaseous carbon dioxide. Some seek to disguise the pinkish color of prepared calamine. They order the lotion with the addition of Ichthammol. They make the zinc oxide lotion pink by adding prepared calamine and the pink is changed to brown! Another factor must be recalled: few patients appear at the physician's office for treatment of the skin who have not already tried "pink lotion" themselves.

The next selection of prescriptions calls for comparatively simple mixtures.

(31) Lanolin..... 16.0
Aquaphor..... 16.0
Water..... 4.0
Oil of rose..... 0.2
Oil orange flower..... 0.4

(32) Boric acid..... 0.5
Lanolin..... 15.0

(33) Milk of magnesia..... 16.0
Aquaphor, to make..... 60.0

We assume that the prescriber recognized that unmodified lanolin called for the hydrated variety —about 30 per cent of water admixed with the lanolin.

We give the next prescription:

(34) Ammoniated mercury..... 0.08
Almond oil,
White petrolatum, of each enough to make..... 8.0

A prescription for:

(35) Yellow oil of mercury.....grains 5
Balsam peru.....grains 30
Lanolin,
White petrolatum, of each enough to make.....drams 4

was probably for some eyelid condition, and may properly be included in this collection of skin remedies prescribed by physicians. The mixture of lanolin and white petrolatum indicates that the prescriber recognized the difficulty of lanolin greases: they do not spread easily.

PHENOL

The next series of prescriptions included phenol. Few prescribers made any distinction between phenol crystals and liquefied phenol. For example:

(36) Calamine and zinc lotion..... 240
Phenol..... 4

The pharmacist who follows this order by adding crystalline phenol to the lotion abets error. The prescription was intended, no doubt, to relieve itching. The phenol crystals are not soluble in the calamine and zinc lotion. They float on top close to the neck of the bottle, and despite "shake" direction labels reach the skin in the crystal form. The experienced pharmacist includes liquefied phenol. There is one part of distilled water to each nine parts of the melted phenol in liquefied phenol. A mixture of equal parts of liquefied phenol and glycerin is miscible with water.

Two other variants of the formula call for phenol in a liquid vehicle.

(37) Phenol.....dram 1
Boric acid.....dram ½
Calamine.....drams 2
Glycerin.....dram 1
Lime water.....ounces 16

(38) Liquor carbonis detergens..... 20
Acid carbolic..... 4
Zinc oxide,
Calamine preparata,
Glycerin, of each..... 30
Rose water..... 136

The addition of the phenols of the coal-tar solution in the preceding prescription indicates practical pharmacology, yet the prescriber ordered rose water. Either the phenol or the coal

tar would completely destroy the odor of rose. The rose water does not hide the characteristic phenolic odor. Note also that zinc oxide colored pink (calamine) is included with the white variety. Both are further discolored by the coal-tar solution.

It is difficult to find pharmacologic justification for the next prescription:

(39) Bay Rum,
Rose water,
Glycerin, equal parts to make..ounces 8
Carbolic acid.....minims 8

The simplest error is liquid measure for the phenol rather than the weight; or the implication that the liquefied phenol is desired. There is no apparent justification for the other ingredients except for the slight alcoholic content of the first; and the fluid of the second.

We consider the mess a variant of the old-fashioned glycerin and rose water mixture.

The next group of prescriptions calls for phenol in a fat or fat-like mixture. The contention is that phenol has no action in such vehicles.

(40) Phenol..... 1/2 per cent
Albolene..... ounces 2

The prescriber orders the pharmacist to calculate the amount of phenol to be included—he did not recall the easy five grains to the ounce make one per cent. He designates the vehicle by a trade name which the Dispensatory describes as liquid petrolatum rather than as the solid variety.

The following prescription indicates that the prescriber recognized that phenol was soluble in oil.

(41) Phenol..... 1 per cent
Olive oil..... ounces 2
Zinc oxide ointment..... ounces 7

More leeway was offered by the following prescription:

(42) Ammoniated mercury..... 5 per cent
Phenol..... 1/4 per cent
Bland base..... ounces 3

There is reason to believe that the mixture of a mercury compound and phenol is a very poor one from the pharmacologic standpoint as well as from the very realistic one on the skin. In theory, the phenol reduces the mercury salt to the metallic mercury. In clinical application, the mixture has led to the appearance of pigmentation.

What did the prescriber mean by "bland base"? Did he seek action on the surface of the cutaneous covering, a form of epidermic vehicle such as mineral fat and fat-like products? Did he seek action in the skin, a form of endodermic vehicle such as some form of animal fat or fat-like product? Did he seek action through the skin for which he would have required a form of diadermic vehicle? The pharmacist has no means of knowing. The prescription should not give him a choice. Bland base might mean anything in the realm of greases. The one selected by the pharmacist might not be the one which gives the patient the result desired. The wrong choice of vehicle might make matters worse instead of better.

The physician who wrote the following prescription gave his patient an opportunity for active reducing chemicals to combine on his skin.

(43) Phenol.....minims 5
Pix liquidum.....dram 1
Balsam peru.....drams 2
Powdered sulfur.....drams 2
Starch.....ounce 1/2
Lanolin, to make.....ounces 2

We need not review the objections to phenol without designation, in this case crystalline in the liquid measure, but call attention to the lanolin vehicle which requires the hydrated variety, and the starch powder to 25 per cent of the total.

There is no indication as to the type of sulfur the physician wishes. The pharmacist had the choice of three official sulfur preparations: (1) Sulfur which has been washed free of ammonia water until it no longer imparts a blue color to red litmus paper (Sulfur Lotum or Washed Sulfur). (2) Sulfur which when added to water and filtered has a filtrate neutral to litmus (acid or alkali) paper (Sulfur Praecipitatum or Precipitated Sulfur). (3) Sulfur with sulfuric acid which reddens litmus and may be present in such quantities as to cake (Sulfur Sublimatum, Sublimed Sulfur, or Flowers of Sulfur).

Is the kind of sulfur important? In theory, acids increase the action of the phenol; and alkalies decrease it. The coal tar in the prescription is alkaline. Its presence in the preparation tends to diminish the action of the phenol.

(44) Ammoniated mercury.....dram 1/2
Salicylic acid.....grains 15
Phenol.....grains 5
Oil of Eucalyptus.....minims 20
Aquaphor, to make.....ounce 1

The combination of ammoniated mercury and salicylic acid is popular despite the theoretical possibility that they are incompatible. We have mentioned the undesirable result of mixing the mercury and phenol. The eucalyptus oil is a good germicide. Salicylic acid in three per cent concentration acts as a keratoplastic agent—it increases the thickness of unbroken epidermis (we devote more space to this subject later). The base is Aquaphor which is desirable in certain prescriptions because of its ability to take up many times its weight of water. But, there is no fluid in this formula! We may well ask "Why Aquaphor"?

Comment is not needed for the next two prescriptions:

(45)	Salicylic acid	2.0
	Sulfur	2.5
	Carbolic acid	2.0
	Resorcin	5.0
	Aquaphor, to make	60.0

(46)	Phenol	grains 3
	Naftalan	dram 1/2
	Aquaphor, to make	ounce 1/2

MENTHOL

The problems offered by prescriptions calling for menthol mixtures are about the same as those which apply to phenol.

A pharmacist is asked to mix:

(47)	Menthol	2
	Stearate of zinc, to make	100

The menthol crystals are not easily crushed and evenly interspersed with the fatty powder particles. It would be better pharmaceutics if the pharmacist were instructed to dissolve the menthol in alcohol, intimately mix with the powder, and then volatilize the alcohol by agitation without heat. The concentration of menthol prescribed is about two to five times higher than is necessary for any possible beneficial effect on the skin. There is a special manufacturing method for the interaction of menthol and a powder base but it is not available for extemporaneous prescription compounding.

A prescription which calls for:

(48)	Menthol	grains 5
	Burow's solution	ounce 1/2
	Water, to make	ounces 2

disregards the fact that menthol is only slightly soluble in water. The crystals float on the surface of the fluid and are not interspersed in the mixture.

The same objection arises for the addition of menthol in a modified lotion as for phenol:

(49)	Menthol	grains 10
	Zinc oxide	drams 2
	Powdered prepared calamine	dram 1
	Glycerin	dram 1
	Rose water	ounce 1/2
	Milk of magnesia, to make	ounces 4

Similarity to the prescription for phenol in grease is noted here:

(50)	Menthol	1/2 per cent
	Liquid Albolene, enough	

The pharmacist was given the task of deciding the quantity to be dispensed. He also was to determine the correct amount of menthol.

We need not comment on the following:

(51)	Menthol	grains 5
	Ointment of boric acid	ounce 1

(52)	Boric acid	grains 10
	Menthol	grain 1
	Vaseline, to make	ounce 1

(53)	Methyl salicylate	0.5
	Menthol	0.5
	Petrolatum	30.0

(54)	Resorcin	6.0
	Menthol	1.5
	Salicylic acid	2.5
	Rose water ointment	120.0

(55)	Menthol	2.0
	Resorcin	10.0
	Bichloride of mercury	0.04
	Salicylic acid	10.0
	Alcohol, 70%, to make	200.0

(56)	Menthol	dram 1
	Salicylic acid	drams 3
	Boric acid powder	ounces 3
	Talc	ounces 3
	Starch	ounces 3
	Powdered camphor	dram 1/2
	Powdered sulfur	drams 2

The prescribers of the above mixtures of menthol with methyl salicylate, salicylic acid, camphor and resorcin probably recalled that the various combinations caused the formation of a thick liquid. Such combinations require vehicles with a high concentration of alcohol for their solution. If improperly or incompletely dissolved, combinations of menthol with its incom-

patibilities may be very irritating to the skin. Since they are offered for their anesthetic effect on the specific nerve endings for pain, additional irritation is unwelcome. The sensation of coolness on application of menthol is due to the stimulating effect on the nerve endings for cold.

MENTHOL AND PHENOL

Mixtures of menthol and phenol are very popular. The two ingredients are found in combinations listed for each in the two series immediately preceding. Phenol and menthol form a liquid when triturated together. The liquid is soluble only in alcohol. The comments made above are applicable. The prescriptions follow:

(57)
Menthol	grains 10
Phenol	drams 1½
Calamine,	
Zinc oxide, of each	drams 3
Lime water, to make	ounces 6

(58)
Phenol	1.2
Menthol	.1
Prepared calamine	16.0
Zinc oxide	16.0
Alcohol, 10%, to make	120.0

(59)
Phenol	dram ½
Menthol	grains 10
Zinc oxide	ounce 1
Calamine	ounce 1
Dilute subacetate of lead	ounce ½
Oil sweet almonds	ounces 3
Lime water, to make	ounces 8

We note the incompatibility of phenol with a metal (lead); the unmodified calamine; and the need for emulsifying the oil with the lime water. The resulting emulsion will not be stable because of the presence of the active ingredients. The mixture will require a Shake Label, defeating the idea of the emulsion. We do not give further notice of the action of the mild alkali (lime water) and the phenols.

The pattern of the following prescriptions is readily appreciated:

(60)
Menthol	1.0
Phenol	0.5
White vaselin	50.0

(61)
Menthol	grains 3
Phenol	grains 2
Zinc oxide	dram 1
Rose water ointment	ounce 1

The practicability of the preceding prescription depends entirely upon the type of rose water ointment the pharmacist uses. It is entirely possible that an official Unquentum Aqua Rosae, U. S. P. will be quite unsuitable, particularly on any agitation, since the emulsion will break. A cheaper nonofficial rose water ointment, which is not an emulsion in the chemical sense, offers a better medium for the menthol and phenol.

(62)
Menthol	grains 10
Phenol	dram ½
Calamine	drams 4
Zinc oxide ointment	ounces 4

(63)
Menthol	grains 7
Carbolic	minims 8
Zinc oxide	drams 2
Starch	drams 8
Unguentum aqua rosae	ounce 1

(64)
Phenol	dram 1
Menthol	grains 15
Resorcin	dram 1
Zinc oxide	ounce ½
Magnesium carbonate	drams 2
Glycerin	drams 2
Aqua hamamelidis, to make	ounces 8

Counterparts for the following have been commented upon earlier:

(65)
Menthol	0.1
Phenol	0.3
Precipitated sulfur	0.6
Resorcin	0.6
Cold cream, to make	30.0

(66)
Phenol	grains 3
Menthol	grains 5
Dermatol	ounce ½
Unguentum aqua rosae	ounce 1

(67)
Phenol	grain 1
Menthol	grains 3
Bismuth subgallate	ounce ½
Boric acid ointment, to make	ounce 1

BISMUTH SUBGALLATE

Dermatol or bismuth subgallate is found in a number of prescriptions. The following require no comment:

(68)
Bismuth subgallate	dram 1
Boric acid	ounces 2

(69)
Zinc Oxide,	
Dermatol, of each	dram 1
Unguentum aqua rosae,	
to make	ounce 1

(70) Ichthyol.....dram ½
Dermatol.....dram ½
Unguentum boric acid, to make.....ounce 1

(71) Aristol.....grains 10
Dermatol.....ounce 1

The physician who prescribed thymol iodide wrote the official name for Aristol.

(72) Thymol iodide.....grains 15
Boric acid powder.....drams 3
Talc, to make.....ounces 3

The mixture of thymol iodide with the boric acid powder offers certain possibilities of incompatibility, as the first is not stable with either acid or alkali. For the most part, thymol iodide is offered alone as a dusting powder.

EURESOL VS. RESORCIN MONOACETATE

The influence of a pharmaceutical house with a product and a good educational director is evident in the next series of prescriptions. There is no doubt that they are inspired: six of the eight call for the ingredient by its trade name.

(73) Euresol pro capilli..... 4
Alcohol, 90%, to make..... 120

(74) Euresol..... 3
Castor oil..... 2
Alcohol, 70%..... 60

(75) Euresol..... 3.0
Salicylic acid..... 2.0
Castor oil..... 1.2
Alcohol, 85%..... 120.0
Oil of bay..... 0.4

(76) Resorcinol monoacetate.....drams 2
Betanaphthol.....grains 10
Olive oil.....drams 3
Ethyl alcohol, 70%.....ounces 8

(77) Resorcin monoacetate.....drams 2
Betanaphthol.....grains 15
Spirits odoratus.....dram 1
Glycerin.....drams 2
Alcohol.....ounces 3
Aqua, to make.....ounces 6

The resorcin monoacetate available under that name is considered by many not to be the counterpart of the euresol, and certainly not the equivalent of the perfumed euresol. There is a difference in price.

(78) Euresol.....dram 1
Acid salicylic.....dram ½
Bichloride of mercury.....grains 2
Glycerin.....drams 2
Spirit vini rectificatum, 70%...ounces 8

(79) Euresol.....drams 2
Bichloride of mercury.....grain 1
Castor oil.....drams 2
Spirit odoratus.....drams 6
Alcohol, 70%.....ounces 8

(80) Liquor carbonis detergens..... 10
Euresol..... 10
Oleum recini..... 2
Alcohol, 70%, to make..... 200
Eau d' Cologne odor.

SALICYLIC ACID

Salicylic acid was an ingredient in 19 of the prescriptions intended for the skin. The action of salicylic acid is representative of the group which Unna described as chemical reducing agents. The action of such reducing agents on the skin varies with the status of the epidermis—whether intact or ruptured. Further, with intact epidermis, the action varies with the concentration. Briefly, on the intact epidermis, concentration of less than six per cent acts as a keratoplastic; higher than six per cent, reducing agents act as keratolytics. They increase the thickness of the corneum which ultimately lifts off by reason of granular layer cell irritation. Discoloration and sensation of itching (pain in keratolytic concentration) accompanies these activities. The action on the exposed cutis does not depend upon the concentration but upon the anatomical structure. There is an accompanying reaction due to induced inflammatory changes. Parasites are destroyed both by the chemical action of removing needed oxygen, and by lifting off the epidermis and physical removal of implanted ova, etc.

It is impossible to determine from the written prescription which action the physician sought when he wrote for the inclusion of salicylic acid. We do not attempt to guess. The following arrangement has no special significance.

(81) Acid salicylic.....grains 15
Amyli.....grains 150
Talci.....ounces 3

(82) Salicylic acid.....dram ½
Lanolin.....ounce 1

(83) Salicylic acid.....grains 15
Starch,
Zinc oxide, of each.....drams 2
Petrolatum, to make.....ounce 1

(84–86)

Salicylic acid..3 per cent	1.	grains 10
Benzoic acid..6 per cent	2.	grains 20
Petrolatum, to make....ounces 2	30.	ounce 1

(87) Salicylic acid.....grains 30
Ammoniated mercury.....dram 1
Unguentum Aquaphor, to make.....ounces 2

(88) Salicylic acid..... 0.3
Ammoniated mercury..... 1.5
Lanolin..... 12.0
Petrolatum, to make..... 30.0

(89) Acid salicylic.....grains 10
Ammoniated mercury.....grains 30
Bismuth subnitrate.....drams 2
Aquaphor,
Unguentum aqua rosae, of each to make.....ounce 1

(90) Acid salicylic..... 1 per cent
Sodium thiosulfate..... 2 per cent
Acid boric,
Talc, of each to make sufficient.

The chemistry of sodium thiosulfate in relation to skin therapy is very complex. The activity depends upon the chemical reaction of the part to which it is applied. The acidity or alkalinity of the media is of utmost importance. The salt requires solution for its ionization. Prescribed in a powder would defeat this, unless the part to which applied was very moist. The presence of two other agents, salicylic acid and boric acid, add to the difficulties of analysis of reaction. Further, the concentration, 2 per cent, is very low for measurable effect. By and large, sodium thiosulfate is best prescribed alone.

(91) Salicylic acid..... 3
Flowers of sulfur..... 5
Aquaphor, to make..... 100

(92) Salicylic acid.....grains 20
Precipitated sulfur.....grains 40
White petrolatum, to make....ounces 2

(93) Salicylic acid.....dram ½
Precipitated sulfur.....dram 1
Unguentum aqua rosae, to make.....ounce 1

(94) Salicylic acid..... 1.5
Precipitated sulfur..... 1.5
Lanolin..... 5.0
Aquaphor,
Aqua, of each *q. s.*..... 60.0

(95) Salicylic acid,
Precipitated sulfur, of each..... 3.0
Olive oil,
Aquaphor, of each..... 30.0

(96) Salicylic acid..... 0.5
Tincture iodine..... 1.0
Spirit of camphor..... 50.0

We assume that the foregoing prescription was intended as an antiseptic application. Spirit of camphor acts as a volatile oil in this respect. The salicylic acid and tincture of iodine are not very helpful in the low concentration offered. They may be incompatible on the ground that one is an oxidizing agent, and the other a reducing agent.

(97) Oleum rusci..... 2
Salicylic acid..... 2
Ammoniated mercury..... 2
Lanolin,
Petrolatum, of each, to make... 30

(98) Ammoniated mercury..... 2
Salicylic acid..... 1
Carboneol..... 1
Zinc oxide ointment, to make... 30

(99) Salicylic acid..... 0.3
Thigenol..... 3.0
Oleum cadini..... 1.0
Unguent. acidi borici (3%).... 30.0

(100) Bichloride of mercury..... 0.25
Acidi salicylic,
Resorcin,
Anthrasol, of each..... 3.0
Spirits vini rect. (70%), to make..... 120.0

The three prescriptions immediately preceding call for proprietary ingredients. The U. S. Dispensatory does not mention Carboneol.

Dr. Goodman's analysis of dermatological prescriptions will be concluded in the November issue of THIS JOURNAL.

ISOPROPYL ALCOHOL

CURTAILMENT OF THE USE OF ETHYL ALCOHOL MAY FORCE THE USE OF THIS COMPOUND AS A REPLACEMENT IN RUBBING COMPOUNDS AND FOR OTHER PURPOSES

WITH the production of smokeless powder, synthetic rubber and other war materials making heavy demands upon the amount of ethyl alcohol which is being produced in this country, even despite the conversion of liquor distilleries, it is inevitable that before long there will be a drastic curtailment in the amount of this substance which will be available for civilian use, including medical and pharmaceutical purposes. The health professions will have to study carefully their use of ethyl alcohol, find replacements wherever possible, and exercise strict conservation measures in those cases where no other material can be used satisfactorily.

Long ago the use of isopropyl alcohol was recommended by authorities in this field for many of the purposes for which ethyl alcohol is used; in fact, it is already being used in many hospitals in this country in rubbing alcohol compounds, for the disinfection of the skin before operations, for the disinfection of hypodermic syringes and needles and surgical instruments, in stains and reagents, and in the preparation of various external medicaments. Isopropyl alcohol has long since been accepted for certain purposes by the Council on Pharmacy and Chemistry of the American Medical Association and included in New and Non-Official Remedies, and it is also found in the British Pharmaceutical Codex. It has been under consideration by the National Formulary Committee and at present stands accepted for the next edition of this official compendium.

PRODUCT OF PETROLEUM INDUSTRY

Isopropyl alcohol is not only a satisfactory replacement for ethyl alcohol in many of its uses, but it is actually superior in certain regards, being more antiseptic and bactericidal against many organisms. It also has the advantage of lower surface tension and a greater fat solvent action than ethyl alcohol. In addition, it does not produce the exhilaration in the human body that is characteristic of ethyl alcohol, hence there is no object in using it as a beverage, and, therefore, it is free from the burdensome governmental control and taxation to which ethyl alcohol is subject. Of pointed interest just now is the fact that isopropyl alcohol is obtained as a product of the petroleum industry by the absorption of olefin gases containing propylene in sulfuric acid, and hydrolyzing the resulting sulfuric acid esters; thus particularly critical materials are not involved.

If and when the day comes that the use of ethyl alcohol is curtailed and isopropyl alcohol is recommended as a replacement for certain purposes, the pharmacist will need to be familiar with its properties, its pharmacology and its uses as physicians and the public will look to him for such information.

Isopropyl alcohol is a clear, colorless liquid with a characteristic odor and a bitter taste. It is miscible with water in all proportions and is miscible with chloroform and ether, but insoluble in salt solutions. Its specific gravity at 25° C is from 0.780 to 0.790. It volatilizes at low temperatures and boils at from 81° to 82° C.

RUBBING COMPOUND

Isopropyl alcohol is suitable for purposes of rubbing compounds, the following formula having been used for several years by the University Hospital, of the University of Michigan, as a Back Lotion:

Isopropyl alcohol	25.0
Glycerin	10.0
Acetic acid, 4 per cent	2.5
Water, *q. s.*	100.0

Coloring and perfume may be added.

It has also been used at the University Hospital to replace ethyl alcohol in Tincture of Green Soap and Solution of Coal Tar, and it would undoubtedly be acceptable in such external preparations as scalp tonics, Chloroform Liniment, Tincture of Larkspur, Spirit of Camphor, Tincture of Benzoin and Bay Rum. Such preparations, however, could not be designated by official titles as they vary from the official formulas.

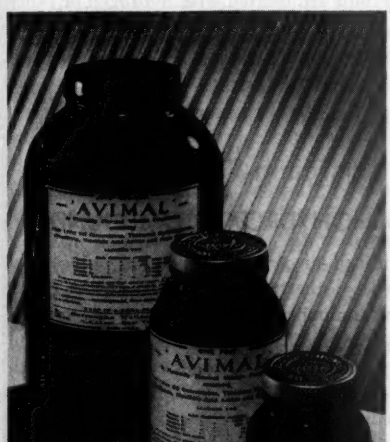
Isopropyl alcohol has been found, on animals, to be about twice as toxic as ethyl alcohol, and little work has been done on its use in preparations intended for internal use. Studies in England, however, have found it suitable as a menstruum and solvent for preparations in which it is completely evaporated during manufacture.

ANTISEPTIC AND DISINFECTANT

Isopropyl alcohol is used today in many hospitals as a surgical antiseptic and disinfectant. At the University Hospital, University of Michigan, a 50 per cent solution, colored red, is used for preoperative preparation by the surgeon and also on the field of operation. Some investigators have ranked isopropyl alcohol ahead of ethyl alcohol as a disinfectant for the hands.

Isopropyl alcohol can be used for the soaking of previously cleansed and sterilized surgical instruments and, since it is said not to affect the potency of insulin, it is used as a disinfecting agent in connection with the administration of this drug. The maximum bactericidal concentration of isopropyl alcohol has been stated to be full strength, 98 to 99 per cent, and the lower water content as compared to 70 per cent ethyl alcohol rendering instruments less liable to corrosion.

Isopropyl alcohol is an excellent solvent for creosote and is widely used to remove this substance from the skin to prevent burns.



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PHARMACEUTICAL APPLICATIONS OF 2-Methyl-2-amino-1,3-propanediol

by GORDON A. BERGY

PROFESSOR OF PHARMACY, WEST VIRGINIA UNIVERSITY COLLEGE OF PHARMACY

COMPOUND FORMS ORGANIC SOAPS WITH HIGHER FATTY ACIDS, SUCH AS OLEIC AND STEARIC, WHICH MAKE GOOD EMULSIFYING AGENTS FOR USE IN LOTIONS, CREAMS AND OTHER PREPARATIONS

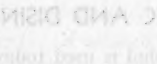
THE large-scale production of the nitroparaffins and some of their derivatives represents a new chapter in the development of the synthetic organic chemical industry.

Nitromethane, nitroethane, 1-nitropropane and 2-nitropropane are presently being made and nitroparaffins with longer carbon chains are possible and may appear later in commercial production. These four lowest members of the nitroparaffin series are formed simultaneously when propane and nitric acid or nitrogen oxides are brought together in a vapor state at elevated temperatures. The nitroparaffins are separated as a crude mixture from the unconverted hydrocarbons and nitrogen oxides, which are recycled through the reaction chamber. The individual nitro compounds are obtained by fractional distillation and chemical purification.

CHEMICAL PROPERTIES

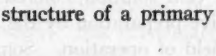
The nitroparaffins were discovered by Victor Meyer in 1872. He obtained a mixture of isomers, ethyl nitrite and nitroethane by reacting ethyl iodide with silver nitrite. Nitroparaffins are mildly acidic in aqueous solution, due to the presence of nitronic acids formed therein. While the normal structure of a primary nitroparaffin is

in the presence of water this changes to



Corresponding amines are formulated when nitroparaffins are treated with hydrogen or other reducing agents:

Similarly



AMINOHYDROXY COMPOUNDS

The nitrohydroxy compounds are reduced by hydrogen or other reducing agents to the corresponding aminohydroxy compounds. Thus the tris (Hydroxymethyl) nitromethane is reduced to tris (Hydroxymethyl) aminomethane, 2-nitro-2-methyl-1,3-propanediol to 2-amino-2-methyl-1,3-propanediol and 2-nitro-2-methyl-1-propanol to 2-amino-2-methyl-1-propanol. Aminohydroxy compounds of this nature form organic soaps when mixed with higher fatty acids such as oleic or stearic. These soaps are excellent emulsifying agents. On heating such soaps, amides are formed: R—COOH—$NH_2C(CH_3)_2CH_2OH$, R—CONH—$C(CH_3)_2CH_2OH$.

The aryl alkyl nitroalcohols and nitroolefins react similarly to the aliphatic nitrohydroxy compounds. Thus, the 1-phenyl-2-nitro-1-propanol may be reduced to 1-phenyl-2-amino-1-propanol and 1-phenyl-2-nitro-1-propene to 1-phenyl-2-

Presented before the Sub-Section on Hospital Pharmacy, Denver meeting, A. PH. A., 1942.

amino-propane, the salts of which have pharmaceutical uses.

PHARMACEUTICAL APPLICATION

2-Methyl-2-amino-1,3-propanediol* is a yellowish white crystalline product, odorless, and readily soluble in water. A tenth-molar solution has a *p*H of 10.78, indicating low alkalinity. It is soluble in alcohol, but not appreciably in the hydrocarbon oils. With a molecular and combining weight of 105, it will unite with 284 parts of stearic acid or 282 parts of oleic acid to form the corresponding esters which in this instance may be more specifically referred to as soaps. To the touch, these soaps possess a hardness somewhere between those formulated from potassium and sodium, and if prepared from carefully prepared chemicals they remain snow-white in color.

2-Methyl-2-amino-1,3-propanediol has been laboratory tested and found to be entirely harmless to the skin. Adequate laboratory production is now assured with careful controls for constants of purity. In pharmaceutical procedure it is not essential to preform the ester, but rather to formulate it in line with the production product. In the event that liquid hand creams be the consideration, a supplementary suspending agent is desirable to retard separation. These agents which are in most general use are mucilaginous in nature, formulated from karaya, quince, tragacanth, sodium alginate or methyl cellulose, in the strength of 1 per cent, using distilled water, with an added preservative 0.1 per cent of an alkyl ester of parahydroxy benzoic acid. Methyl parahydroxybenzoate, N. F. VII is recommended.

A LIQUID CREAM LOTION

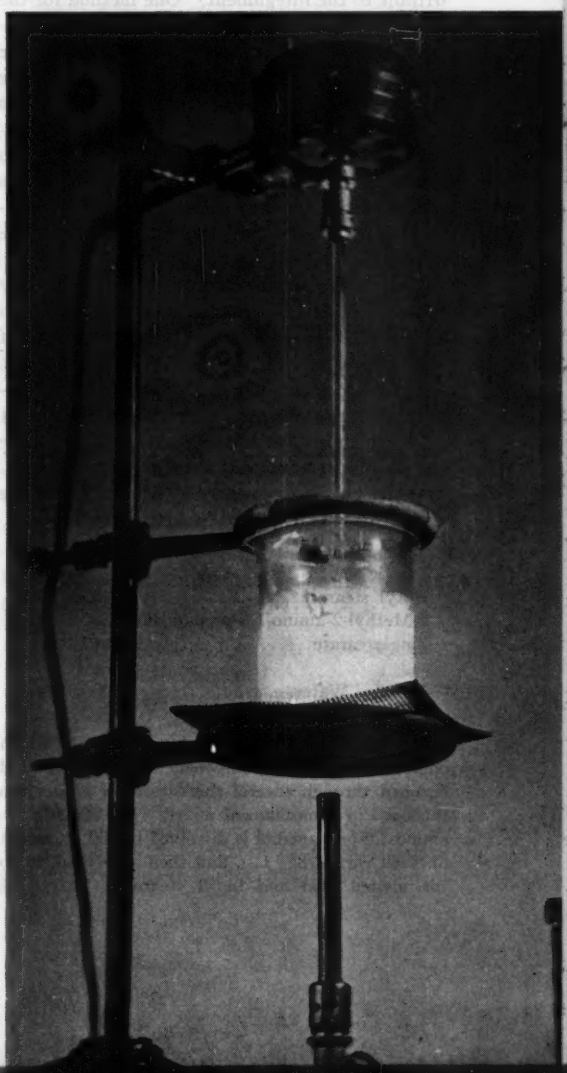
Stearic acid	5.0
Cetyl alcohol	2.0
Butyl stearate	3.0
2-Me-2-amino-1,3-propanediol	1.0
Distilled water	50.0

In a suitable vessel, preferably a double boiler, melt the stearic acid, cetyl alcohol and butyl stearate. While hot, strain through a pledget of gauze into a rust-resistant vessel of appropriate size, which by way of convenience may be the bowl of a standard food mixer. Dissolve the 2-methyl-1,2-amino-1,3-propanediol in the distilled water warmed to the temperature of the first component, 85° C. Add the aqueous component to the fatty component and continue the stirring at an intermediate speed until it has cooled to 45° C. when the perfume may be added. Continue the agitation while incorporating all or a portion of the following mucilage.

Part II

Quince seed	20.0 Gm.
Methyl parahydroxybenzoate	1.0 Gm.
Ethyl alcohol	100.0 Gm.
Glycerin	50.0 Gm.
Distilled water, To make	1000.0 Gm.

Dissolve the methyl parahydroxybenzoate in 600 cc. of distilled water, add the quince seed and with occasional stirring allow to macerate, preferably at the temperature of refrigeration, 40° C., through a 24-hour period. Then strain forcibly through a wetted (size free) muslin. Blend the alcohol and



*Available from The Commercial Solvents Corp., 17 E. 42 Street, New York, N. Y. Specify "Cosmetic Grade."

glycerin with 250 cc. of distilled water and add this solution in a thin gentle stream to the mucilage of quince, stirring continuously, in order to avoid coagulation. A clearer and more uniform product may be secured by a second colation, finally adjusting the weight by the addition of distilled water.

The prepared mucilage of quince may now be added to the previously prepared emulsion formulated in Part I. The consistence of the final product may have a range varying in fluidity from the texture of a heavy cream to that of a lotion.

To avoid the inclusion of air, the stirrer should be completely immersed in the liquid.

PROTECTIVE CREAMS

Within recent years, protective creams have gained great favor among industrial workers, especially those groups involved in handling materials which are nonhazardous other than being irritant to the integument. One method for the easy removal of the offending dirt, grease or irritant is the generous application of a protective cream before the beginning of the task. The cream is rubbed upon the skin surface until it has apparently completely disappeared. The resulting surface should be dry and not greasy to the touch. The invisible film which remains upon the surface presents a barrier to the penetration of harmful substances which otherwise might provoke a dermatitis.

Heavy greases and printing inks are readily removed by the subsequent application of such a cream, to be followed by the generous use of soap and water. In the following formula the stearic acid unites with the 2-methyl-2-amino-1,3-propanediol to form the corresponding detergent ester, which in turn acts as the emulsifier for the unsaponified stearic acid and the butyl stearate. Actually this is a superfatted soap in which the zinc stearate is dispersed by attrition.

Stearic acid, U. S. P.	150.0 Gm.
Butyl stearate	50.0 Gm.
2-Methyl-2-amino-1,3-propanediol	20.0 Gm.
Zinc stearate	150.0 Gm.
Distilled Water, *q. s. ad*	1000.0 Gm.

The stearic acid and the butyl stearate which comprise the first component are melted and strained through several thicknesses of gauze into the bowl of a mechanical mixer. The 2-methyl-2-amino-1,3-propanediol is dissolved in 630 cc. of hot distilled water (85° C.), and then slowly added to the melted acid and butyl stearate. Stirring is continued until a temperature of 45° C. has been reached, when the perfume may be added.

In the event that the product may be desired as a base for the incorporation of medicinals, it may be seen by inspection that an incompatibility would exist if admixed with the salts of the heavy metals, forming thereby the insoluble stearates which slowly but eventually cause granulation by reversal of the phase of the emulsion.

CLEANSING CREAMS

Cleansing creams are characterized by their high mineral oil content. A cleansing cream is more extensible than a cold cream, and to a certain degree the extensibility may be altered by the use of a mineral oil of a lighter or heavier viscosity. A cleansing cream too extensible may separate in extremely hot weather, and for that reason may be best dispensed in a collapsible tin tube. As mineral oil is used, the product will not turn rancid. Preservatives and antioxidants are unnecessary. The amount of oil present in creams of this type may have a range between 30 and 60 per cent, those with a latitude between 35 and 45 per cent being most acceptable.

All purpose or general purpose creams may have essentially the same mineral oil content, but their general texture is firmer, due to the inclusion of fats and waxes of higher melting point. In the event that an individual is allergic to mineral oils, other oils such as olive oil, corn oil or peanut oil may replace the mineral oil weight for weight, but one will experience a slight alteration in texture, due to a viscosity difference in the oils. Pyrogallol used to the extent of 0.1 per cent is one of the most satisfactory antioxidants, though some prefer to use maleic anhydride. Where a change in the texture of a cream is to be avoided, the substitution of butyl stearate for heavy viscosity mineral oil is indeed possible. Butyl stearate is merely a low melting wax, synthetically prepared from the reaction of butyl alcohol and stearic acid. Its keeping power is ideal, since it may be prepared from chemicals of a very high degree of purity.

	I	II
Stearic acid, U. S. P.	8.0 Gm.	8.0 Gm.
Paraffin	7.0 Gm.	
Mineral oil (Heavy Viscosity)	30.0 Gm.	35.0 Gm.
Albolene (McKesson) or Purwhite (Sherwood)		10.0 Gm.

	I	II
Ceresin	2.0 Gm.	
2-Amino-2-methyl-1,3-propanediol	3.0 Gm.	3.0 Gm.
Glycerin U. S. P.		5.0 Gm.
Distilled water	50.0 Gm.	39.0 Gm.

The fatty ingredients forming the first component are fused and strained through a thin pledget of gauze into the bowl of a mechanical mixer. Those ingredients which form the second component by their solubility in water are warmed to the temperature of 75° C., and carefully added to the first. Agitation is continued until the temperature of the resultant emulsion has cooled to 45° C., when the perfume is added.

Paraffin serves to stiffen the product, whereas the ceresin prevents bleeding. Lanolin behaves similarly, but is more often confined to the formulation of lubricating, night creams or conditioning creams, these names superseding those products formerly sold as tissue creams before the enactment of the Food, Drug and Cosmetic Act of 1938.

CONDITIONING CREAMS

Stearic acid	115.0 Gm.
Mineral oil (U. S. P. Heavy Viscosity)	60.0 Gm.
Anhydrous lanolin (odorless)	50.0 Gm.
Oil of theobroma	20.0 Gm.
Butyl stearate	30.0 Gm.
Glycerin	25.0 Gm.
2-Amino-2-methyl-1,3-propanediol	20.0 Gm.
Distilled water	680.0 Gm.

The first five ingredients are fused and strained, if necessary, through gauze into a mixing bowl or mortar of appropriate size. The 2-amino-2-methyl-1,3-propanediol is dissolved, together with the glycerin in the water and elevated to the temperature of the first component which is about 85° C. Stirring or trituration is continued until the mass has cooled to a temperature of 45° C., whence the desired perfume may be added. This is a relatively firm cream of good texture if properly prepared.

ANTI-TAN CREAMS

Anti-tan creams may be prepared by milling the cream of the desired formula with 5 per cent pigment which may be one or a combination of the umbers. Opaque pigments as zinc oxide, zinc stearate and titanium dioxide have been successfully used alone or in combination with the umbers since they prevent the ultraviolet portion of the spectrum from reaching the skin. Other screens which are effective as reflectors are the umbelliferones, menthyl (not methyl) benzyl and phenyl salicylates, the salts and derivatives of hydroxy-naphthoic acid and many others.

DISPERSION CREAMS

In pharmaceutical procedure it is frequently necessary to disperse resinous, oleoresinous and balsamic substances in an ointment base of amber or white petrolatum. Experienced operators realize the difficulties encountered, and turn their efforts to an intermediate vehicle which exerts a partial solvent action upon the medicament. Such a vehicle is that of the present edition of the National Formulary, recognized as Petroxolinum Spissum, the formula of which is as follows:

Petroxolinum Spissum

Yellow wax	35 Gm.
Light liquid petrolatum	20 Gm.
Oleic acid	32 Gm.
Oil of lavender	3 cc.
Alcohol	5 cc.
Stronger ammonia water	6 cc.
To make about	100 Gm.

The formulation is achieved by melting the yellow wax with the liquid petrolatum on a water bath, the oleic acid is incorporated, the mixture transferred to a warm mortar, and when nearly congealed the alcohol and the stronger ammonia water, previously mixed and warmed, are incorporated, then the product is continuously stirred until cool. Finally the oil of lavender is added.

The method of procedure does not permit the production of a series of products of uniform standards, due to loss in transfer from container to mortar, but also to loss through the volatilization of the warmed alcohol and the stronger ammonia water.

A uniformly better product may be produced by accepting an item of the following composition:

Yellow wax	30 Gm.
Light liquid petrolatum	15 Gm.
Oleic acid	25 Gm.
Oil of lavender	3 cc.
2-Amino-2-methyl-1,3-propanediol	9 Gm.
Water	18 cc.
To make about	100 Gm.

The appearance and texture of this product are very similar to those of the official solid petroxo-

lin. Needless to say its properties are similar. It can be used to replace weight for weight the solid petroxolin indicated in the assembly of Unguentum Sulfuris Compositum of the National Formulary, in which preparation the medicament to be dispersed is Juniper Tar. The dispersing cream serves ably when the medicament is Peruvian Balsam or Pix Pini.

HAIR SHAMPOO

Oleic acid	55 Gm.
Cocoanut oil	40 Gm.
2-Amino-2-methyl-1,3-propanediol	58 Gm.
Alcohol, U. S. P. or approved denatured form to make	200 cc.

The oleic acid, cocoanut oil and the 2-amino-2-methyl-1,3-propanediol are fused together in a casserole or vessel of appropriate size, the heat being continued for 10 minutes until reaction is complete. Upon cooling, the appropriate odor may be added and the product diluted with alcohol to the desired volume. The alcohol serves as an antifoam, but in the presence of water is inactive. A free lathering shampoo of appropriate bubble size results. The product may be appropriately colored with FD&C Green No. 3 which is a green fast to alkali.

SHAVE CREAM (LATHER VARIETY)

Stearic acid	57 Gm.
Cocoanut oil	20 Gm.
2-Amino-2-methyl-1,3-propanediol	40 Gm.
Glycerin	20 Gm.
Distilled water	150 Gm.
Perfume (Lilac)	5 Gm.

Fuse the stearic acid, cocoanut oil and the 2-methyl-2-amino-1,3-propanediol in a casserole or vessel of appropriate size, add the glycerin and the distilled water previously heated to boiling. Allow the reaction to continue for 10 minutes, stir until cool, whence the perfume may be added. By adjustment of the final water volume, a soap of the desired consistency may be prepared.

SHELLAC

Lac., Lacca., Resina (Gummi) Lacca is a resinous substance obtained from several trees growing in the East Indies, India and Burma, when infested by the sucking insect *Coccus Lacca* (Fam. Coccidae). It represents an exudation from the bodies of the insects and according to Misra (*Pharm. Era*, 1919, Iii, 95) lac is a secretion produced by a scale insect which sucks the juice of plants. The sap ingested is transformed and exudes uniformly as a resin through the body pores. Stick-lac is the resin as taken from the tree (Schleichera trijuga) still encrusting the small twigs around which it originally concreted. Seed-lac is prepared by scraping off the resinous covering of the twigs, and partially exhausting the coloring water by the aid of water.

Shellac, which is a product of lac, is prepared by melting stick-lac or seed-lac previously deprived of its soluble coloring material with a small amount of orpiment and colophony, straining and pouring it upon a flat, smooth surface to harden, or pulling it out by hand into large thin orange-colored sheets which are broken up after cooling. The final product is composed of 91 per cent resin, 0.5 per cent of dye with varying amounts of wax, usually between 1 and 3 per cent.

Lac in its crude state is wholly inert and was formerly employed in medicine for its astringent properties. The color which may be present in commercial samples may be attributed to the presence of orpiment (arsenic trisulfide). Such a product renders it unfit for the glaze for good and confectionary products. The so-called white shellac is a chlorine-bleached arsenic-free lac used extensively as a textile size. It is also the chief constituent of sealing wax. Shellac, incorporated in floor polishes to the extent of 2%, serves as an anti-slip agent. It also increases the film's resistance to wear, but in no manner is the brilliant specular quality of the film altered.

DISPERSIONS OF SHELLAC, CASEIN AND RESIN

Casein and shellac are animal products which are acidic in character and hence may unite with amines to form the corresponding soap-like products. A partial neutralization of the casein or shellac with 2-amino-emethyl-1,3-propanediol, like the partial neutralization of stearic or oleic acid, or the abietic acid of resin, will produce sufficient soap to neutralize the remainder of the material. As a rule 15 per cent by weight of 2-amino-2-methyl-1,3-propanediol by weight of casein or shellac or resin will produce an excellent dispersion. The dispersion of shellac may be effected by melting the shellac with the 2-amino-2-methyl-1,3-propanediol and dissolving in boiling water, 10 per cent alcohol being added upon cooling to yield a clear solution of the shellac. This product is used as one form of "size." "Anti-slip" floor polishes are prepared by the incorporation of about 2 per cent of shellac.

Shellac is soluble in alcohol and with the aid of ammonia, sodium carbonate, sodium borate, the

ethanolamines and 2-methyl-2-amino-1,3-propanediol and other inorganic or organic alkalies, may be brought to solution with water, the wax being held in suspension.

LIQUID WOOD FLOOR OR METAL POLISH

Carnauba wax	11.05
Stearic acid	1.25
2-Amino-2-methyl-1,3-propanediol	2.00
Sodium borate	0.84
Shellac	1.85
Aq. Ammonia, 28%	0.27
Alcohol (optional)	30.00*
Distilled water	82.86

Fluidify the shellac by the addition of the ammonium hydroxide to 30 cc. of alcohol, or as an alternate method using 15 cc. of distilled water and 15 cc. of alcohol.

By the aid of a steam-jacketed vessel, or a deep water or Dowtherm-A bath, fluidify the carnauba wax and the stearic acid, straining if necessary, through dry muslin or gauze. Elevate to and maintain the working temperature of the wax mixture at 95° C. Dissolve the sodium borate and the 2-amino-2-methyl-1,3-propanediol in 45 cc. of boiling distilled water, adding this solution to the component with continuous stirring until an even paste-like dispersion results. Continue the dilution of the emulsion by the inclusion of the remainder of the boiling water, and the ammoniacal alcoholic solution of the shellac. Continue the stirring and lowering of the heat until the product is cool. This emulsion remains fluid at room temperature and, therefore, may be dispensed in a bottle, shake label attached.

WAX PASTES FOR LEATHER

Carnauba wax	20.0 Gm.
Beeswax	2.5 Gm.
Ceresin	7.5 Gm.
Oil of turpentine	15.0 Gm.
Stearic acid	4.0 Gm.
2-Amino-2-methyl-1,3-propanediol	2.5 Gm.
Distilled water	47.0 Gm.
Oil-soluble Nigrosine or suitable color	2.0 Gm.
Aromatic	1.0 Gm.

By the aid of a steam or deep water bath, melt the carnauba wax (95° C.) beeswax, ceresin and oil soluble dye and cautiously *effect solution* of these in the oil of turpentine heated to a similar temperature, distillation of the oil being prevented by the aid of a reflux condenser (inflammable). Dissolve the 2-amino-2-methyl-1,3-propanediol in the boiling distilled water and add this to the melted stearic acid, continuing the heating and stirring until saponification is complete. Transfer the terebinthinate solution of the waxes to the hot soap solution and continue the agitation until the product has cooled to about 50° C., whence an appropriate aromatic may be added. Dispense in pressed metal boxes with airtight closures. This is an excellent shoe polish.

Specifications of appropriate leather dyes are Nigrosine, Orange II, conc.; Chrysoidine, G. N.; Basic Brown, Br.; Basic Brown, G x P and Pontacyl Carmine, 2 G. The desired intermediate shades may be obtained by blending. (E. I. Du Pont de Nemours & Co., Inc., 1616 Walnut St., Philadelphia, Pa.)

By altering the water content of the emulsion, a heavier or lighter product results.

HYDROCARBON LEATHER CLEANER

Methyl cellulose or Sodium alginate	1.00 Gm.
Distilled water	33.00 Gm.
2-Amino-2-methyl-1,3-propanediol	1.00 Gm.
Stearic acid	2.66 Gm.
Petroleum ether, To make	100.00 Gm.

Disperse the methyl cellulose or sodium alginate or other suitable suspending agent in the distilled water and in this dispersion dissolve the 2-amino-2-methyl-1,3-propanediol. Dissolve the stearic acid in the petroleum ether and formulate an emulsion by pouring the latter component into the former. Larger batches are more conveniently emulsified by the aid of homogenizers. In the absence of mechanical devices, good stability is secured by rapid stirring at the start, then discontinuous agitation until a perfect emulsion forms. By replacing the petroleum ether or low boiling naphtha with a like amount of kerosene and the stearic acid with the oleic acid, and by the omission of the suspending agent, a standard insecticide results.

MINERAL OIL EMULSION

Mineral oil, U. S. P.	43.0 Gm.
Oleic acid or Stearic acid	5.1 Gm.
2-Amino-2-methyl-1,3-propanediol	1.9 Gm.
Distilled water	50.0 Gm.

Dissolve the 2-amino-2-methyl-1,3-propanediol in the distilled water by the aid of heat and pour this solution into the second component of oleic acid and mineral oil, continuing the rapid agitation until a stable emulsion results. In the event that stearic acid be used, each component must be adjusted to a

* Replaces equal volume of water.

temperature of 65° C., before emulsification be attempted.

This product is suitable as a liquid cleansing cream base or oil dressing. If a low grade or unrefined mineral oil replace the medicinal grade, a dormant spray for scale results. Since this is used in cool weather, oleic acid is preferable.

AUTOMOBILE POLISH

Carnauba wax	9 Gm.
Beeswax	4 Gm.
Ceresin wax	4 Gm.
Naphtha or Turpentine	75 Gm.
Stearic acid	7 Gm.
2-Amino-2-methyl-1,3-propanediol	13 Gm.
Distilled water	75 Gm.
Abrasive (Bentonite 25 Gm.) or (Tripoli 60 Gm.)	

The automobile polish may be formulated with or without the abrasive. If bentonite is to be used (oil absorbing) it should be well mixed with the "hot-oil" solution before it is added to the soap solution. If tripoli (water absorbing) is to be used, it is best stirred into the finished emulsion. In either event it is absolutely essential that the abrasives be uniformly dispersed.

By the aid of a steam bath melt the carnauba wax, beeswax and ceresin. Under a reflux condenser elevate the temperature of the naphtha or turpentine to the resultant melting point of the waxes and dissolve the latter therein. Add the bentonite. Heat the water to 85° C. Fuse the stearic acid and 2-amino-2-methyl-1,3-propanediol and dissolve the resultant in the hot water. Add the "hot-oil" component to the soap solution, stirring vigorously and intermittently until emulsification is complete.

A polish similar in nature may be prepared by replacing the beeswax and the ceresin with carnauba wax. A harder and slightly more specular film thus results.

By replacing the bentonite with titanium dioxide, an excellent white shoe dressing results.

PINE OIL EMULSION

Pine oil	91 Gm.
Oleic acid	6 Gm.
2-Amino-2-methyl-1,3-propanediol	3.5 Gm.
Distilled water	100.0 Gm.

Dissolve the 2-methyl-2-amino-1,3-propanediol in 40 cc. of hot distilled water and incorporate the oleic acid previously dissolved in the pine oil. Stir vigorously and intermittently until emulsification is complete. If a very concentrated product is desired the remainder of the water need not be added.

Pine oil emulsion is extensively used as a disinfectant and deodorant. Pine oil combined with the isomeric cresols improves the odor of the Saponated Cresol, U. S. P.

CONCLUSION

In conclusion let it be borne in mind that this new compound now available for use is still in a developmental stage, particularly in relation to pharmaceutical procedure. There is still a great deal of opportunity for experimentation upon the part of the individual pharmacist. The formulas presented have been prepared and their physical properties studied. All formulas may be altered by way of content of oil, fat, wax or mucilage. The pharmacist who dabbles in research for the betterment of his services to the physician and laity has here a new tool of usefulness.

Gabriel, C. L., "Nitroparaffins," *Ind. Eng. Chem.*, 32 (1940), 887.

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